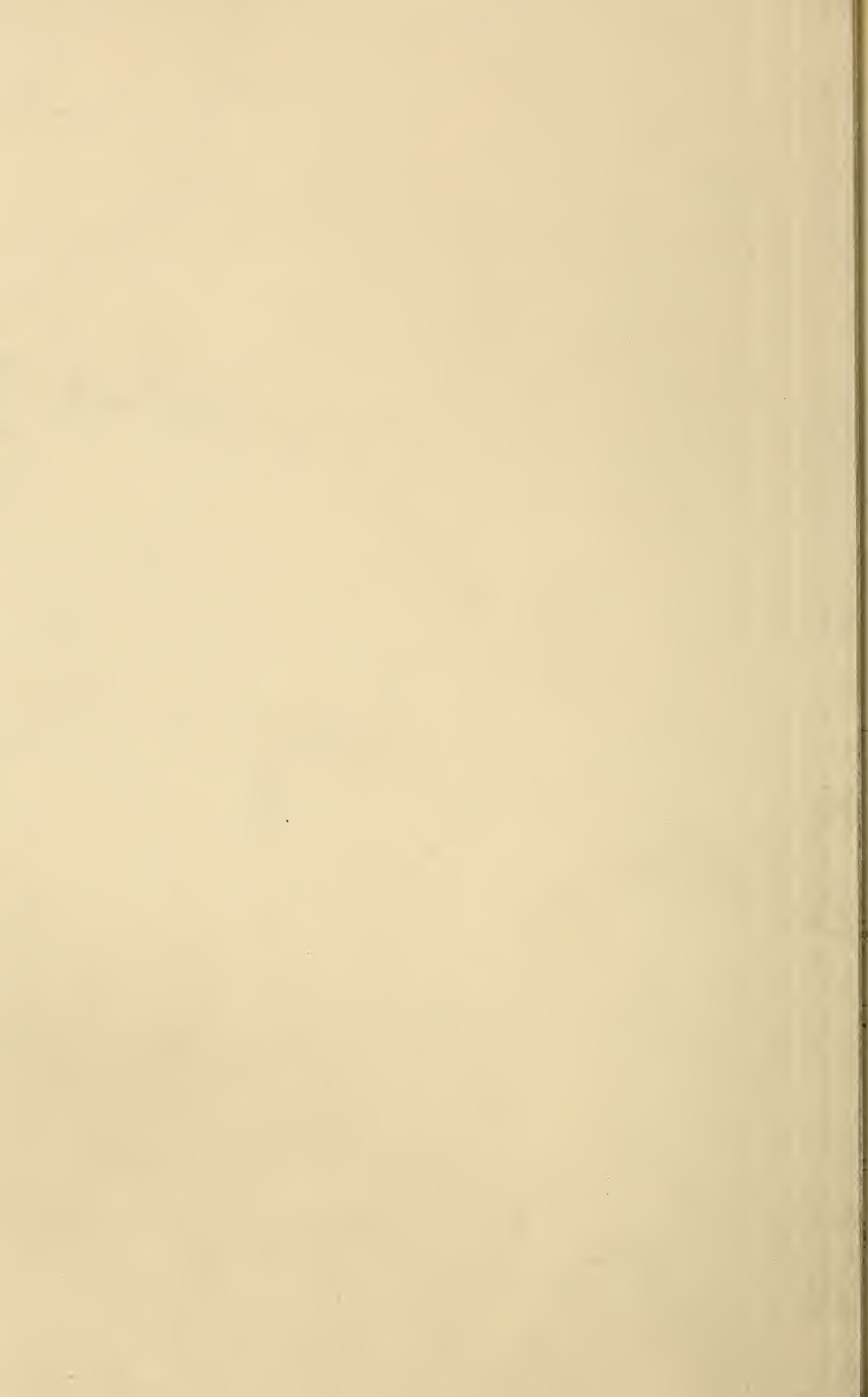


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TO CLEAN about 2200 T tins took $2\frac{1}{2}$ hours, using 3 cans concentrated lye, with hot water, metal tub, and a pair of tongs.

IN ENGLAND, two different separators for use with plain sections have been patented, and a third is on the way.—*Brit. Bee Journal*.

TOO THIN, Mr. Editor, is what you think a $5 \times 4\frac{1}{4}$ section would be. With a fence, to hold the same as an old-style $4\frac{1}{4} \times 1\frac{7}{8}$, it would be $1\frac{1}{2}$ wide—pretty thin, but not quite so thin as bees seal honey in brood-combs. [I was referring not so much to the thickness of the comb as to the relation of thickness to surface.—ED.]

I LIKE HUTCHINSON, and don't want to make him mad. If it weren't for that I'd cast up to him that some one about his length hinted that there wasn't much likelihood of new things, or something of that kind, in the future. Fences, section-cleaners, tall sections, plain sections, and all that, make this one of the "newest" times we've ever had.

A. I. ROOT, when you reached home you were able to eat buckwheat cakes and molasses, p. 227. Were you out of honey? [No, I do not think he is out of honey; but I am sorry he likes maple molasses better than he does the product from the hive, and yet he confesses that honey is far more wholesome for his condition of health than maple sugar.—ED.]

ALL THE SECTION-CLEANERS seem to use sandpaper. I'm watching for one that won't have that trouble and expense—perhaps a metal plate with a surface like a rasp or file. [So am I watching for the same thing. I am just a little afraid that the sandpaper will fill up. It has not done so in the limited trials I have made of it; but somehow it seems as if it *must* do so.—ED.]

DOOLITTLE advises a good workman with the necessary tools to make all his needed wares after starting, except sections, p. 220. Doolittle! I'm a good workman, and I can borrow what tools I lack; but if I can get a

job of sprouting potatoes at 10 cts. an hour I believe I can save money to buy my hives and other "fixin's." [I hope you will fight it out with Doolittle. We will furnish the arena. And the red rag—well, you are holding it up yourself.—ED.]

THAT WISCONSIN FOUL-BROOD LAW is all right so long as men like France and McEvoy are appointed; but if you have governors like we've been having in Illinois, there's no security you'll not have an inspector that doesn't know a queen from a drone. [Yes, it is important to have a good man; but a good man without a good law is powerless to do much if any thing. York State, for instance, has plenty of good men, but it lacks the law.—ED.]

YOU EDITORS are all right not to say any thing about a man if you can't prove it, p. 223; but wouldn't it be a good thing sometimes to tell just what you can prove?—just to give us a hint, you know. [Oh! but we do, doctor. You may be sure that we invariably "squeal" on the commission men when we can prove our ground. When we do not come right out and give their names it is because we can not get the necessary evidence to prove our honest conviction.—ED.]

YOU WANT TO KNOW, Mr. Editor, page 204, what I think about the Doolittle-Golden disagreement. Well, I'll tell you. I think *you* are wrong. I don't know whether Doolittle or Golden is right, but I just don't believe both are. For if one of them in the hundreds of cases he has observed has never seen an exception to the rule that field-bees hand over their plunder to the nurse-bees, I can hardly believe that in other colonies the bees will all dump it in the cells. There's a mistake somewhere.

I. S. TILT seems to think scraping 150 sections a pretty fair day's work. I wish he'd figure a little when he'd get through if he had 18,000 or more to scrape. I may say to him that my scraping was thoroughly done, and 1200 wasn't an extra effort, just the regular number day after day that were scraped, graded, and cased by one person, besides grading and casing some scraped by others. But, understand, she didn't do any thing else; the sections were all placed before her, and the cases taken away.

YES, MR. EDITOR, that testimony of I. S. Tilt, p. 208, is right to the point, and not like Niver's. Mr. Tilt thinks I should throw up the sponge and confess section-holders best. Now, friend Tilt, I have a favor to ask of you. Please tell me *why* I should do as you say. After trying both, the balance of evidence with me runs the other way. I'm ready to change to wide frames without top-bars, just as I changed from them with top-bars, whenever I can see reason for the change. [That does me good. I like to see you take bad medicine without making a wry face. Now, friend Tilt, give him another—*tilt*.—ED.]

"ONE TROUBLE with the deep frame is that the bees will eat away all the stores next to the top where it is the warmest, and the bees sometimes die because the clusters are left high and dry."—Footnote, p. 214. Sa-a-ay. I saw that statement once before, and I thought the man didn't know what he was talking about. Do bees honestly do that way? [What is the matter with the statement in question? Explain *why* you thought the man did not know what he was talking about. "Do bees honestly do that way?" They do indeed, sir, sometimes, at least in our apiary, even on frames as shallow as the Langstroth; and I figure it would be worse if the frames were deep. But look here, doctor—you always winter in the cellar, while *we* almost invariably winter outdoors. See?—ED.]

YOU'RE ALL STRAIGHT in your data, with one exception, page 205, Mr. Editor, about separators, but wrong in your conclusions. You're right in saying I throw away separators after using one season because it costs less to buy new than to clean old, but not to take the naughty kinks out of them. The naughty kinks are only in bad separators; they're there from the start, and you can't get them out. A good plain separator is "good for years" if you clean it, and a fence separator will be thrown away after being used one year if you can buy new cheaper than to clean. See? [No, I do not see. It will never be cheaper to throw away a fence separator and buy a new one than to clean the old one. While fences will probably be cheaper than now, I anticipate the labor of cleaning, if cleaned at all, will be less—a good deal less—than the labor of cleaning the old-style wooden separators.—ED.]

THAT'S A PRETTY FIGHT, p. 212-'13, over the plain section and fence, but it seems to me there are some misses and fouls on both sides. Fight fair, loving brethren; fight fair. [You are very unfair, doctor, to accuse either one of us of not fighting fairly, and then softsoap us both by calling us "loving brethren." You ought to know that, if there was one of us who would not fight fair it would be the "other fellow," of course; but it "breaks me all up," as I made a mistake in my arithmetic, for I can imagine Doolittle chuckling to himself. But then, my point was true, all the same, but not quite so big in degree. You just wait. When you and Doolittle get to fighting over that bottom-board, if I don't find some "misses" and "fouls" it will be because there are not

any to be found. We are preparing the arena now. As umpires I'll appoint Hutchinson and York. Now, then, here is the red rag; but be sure to fight fair, loving brethren.—ED.]

WHAT'S THE MATTER with you, Mr. Editor? You're mixed up because I use 15-oz. sections, and think my practice should correspond with my preaching. It does. I preach that 15 oz. shouldn't be sold for a pound, but for 15 oz., and I practice what I preach. I'm studying on the problem of changing to something lighter. But your mixed-up-ness, I suspect, has led you to think $1\frac{1}{2}$ or $1\frac{3}{8}$ the width of section to contain comb such as bees would build of their own sweet will. In this locality a $1\frac{1}{8}$ section will contain comb the same as in brood-combs spaced $1\frac{3}{8}$. According to what Doolittle has observed, a $1\frac{3}{8}$ section is the right size for such comb as bees naturally build. There isn't as much difference between a $1\frac{1}{8}$ section and what the bees would prefer as most people, editors included, imagine. [I am mixed up worse than ever. You can preach all you have a mind to that 15 ounces should be sold for 15 ounces; but, as sure as fate, every 15-ounce section you sell is liable in some markets to be sold for a pound. No, you can not be consistent until you adopt either the two-inch section or the $1\frac{3}{8}$ or $1\frac{1}{8}$.—ED.]

WHAT'S THE REASON no one ever gave us that kink of Coggs's before—making combs swap places in the extractor? I always lifted out one comb, twisted it around, daubing things as I did so, then went through the same thing on the other side. Seems to me Coggs's way is a good deal quicker, with less daub. [In the case of the ordinary extractor, where the combs are put down into the machine endwise, I am rather of the opinion that the ordinary way would be quicker than the Coggs's. I wish some of our extracted honey men who have possibly tried both methods would tell us which is the better. It is these little things that we want to know about, and it is these little short cuts that save the pennies and the *dollars*. One of the valuable things in Miller's "Year among the Bees"—a book now out of print just because the doctor won't take time enough to revise or re-write it—was that he took pains to go into the minute details. I'd like to know, among other things, just how one fills his smoker; and whether, in working over a hive, he sits down or stands up; and whether he uses bee-veils or gloves, or both; whether he kicks the super off, slap-bang fashion *a la* Coggs's, or takes time to pry it off, using smoke, and a whole lot of other things too numerous to mention.—ED.]

WHAT FOR do you let that proof-reader get at me, Ernest, p. 205, with his legal spelling? I own up, I see it would be all wrong if we couldn't decide exactly the shade of meaning by the spelling. But say, W. P., don't you think there's something lacking yet? Ought there not to be an extra frill in the spellings of "quean" and "queen"? If Ernest writes me he saw you with a "quean," how in the world am I to know by the spelling whether it

was a bad woman or a Scotch girl? And how can I tell whether a "queen" is a bee or a woman? Then a whole lot of words now spelled all the same way should be changed. "Tree" should have three or four different spellings, "horse" five or six, and "dog" at least a dozen. Fact is, most of the words that sound alike are spelled wrongly, aren't they? [Don't be afraid of the proof-reader, doctor; he's your best friend. Your points are all interesting, and well taken. Our language has been a dumping-ground for all others for so long a time that it is not strange we have some words that are pronounced alike, and yet have very different meanings. As for a man being seen in company with a "quean," the word would have to be interpreted by what Andy Johnson used to call a "past record." Taking into consideration the average color of her hair, it would be better not to use ambiguous words in speaking of a Scotch girl (in her presence)—just call her a "bonnie lassie." Really, it is fortunate that the spelling of words having a similar pronunciation is as variant as it is; and to make the spelling absolutely alike should rather be deprecated than encouraged.—READER.]

CALIFORNIA ECHOES

BY J. H. MARTIN.

The complaint about bee-paralysis, which was so general a few years ago, is evidently disappearing. We have had as much of it in California as anywhere; but at our recent meetings there was not interest enough in the subject to cause a discussion. The same might be said of the nameless disease. They are evidently on the wane. We wish we could say the same about foul brood.

There must be a mistake somewhere about that great honey yield put to the credit of Mr. C. A. Hatch. In a recent number of the *Land of Sunshine*, published in this city, there is a statement that Mr. Hatch secured \$1500 for the season's labor. A few days ago I saw Mr. Hatch, and learned from him personally that his honey sold for about \$800. He said that he would like to see the other \$700.

I have just run across another evil under the sun. This time it is not adulterated honey, but it is an adulterated honey-package. Just consider a pound and a half of honey in a pound and a half bottle. There is enough glass in the make-up of the bottle to make half a dozen bottles. Cost of bottle, 4 cts.; cost of honey and putting it into the bottle, 7 cts.; sells for 20 cts. Very good profit, and mostly on glass.

Mr. Thos. W. Cowan says that there are many amateur bee-keepers in England. In the payment of their dues they think nothing of paying double or treble the amount asked. Such liberality gives backbone to the organization. I suppose, owing to our national newness as compared with the age of Britain, we

are in a sort of gristly state yet. There are no hopes that the present generation will see much more backbone than we have at present.

Mr. Editor, I wish to enter a protest against the method Mr. Golden uses to illustrate his machine, see page 132. I have tried to find the useful points in the machine, but never get further than the beautiful young lady in the foreground who is looking right at a fellow. Take her away so I can study the machine. Stop my paper. [Didn't think of it before, but Golden must have had his eye on you. So you've been caught in the trap? Tired of making flap-jacks and keeping bachelor's hall, eh?—ED.]

The usual method recommended for the cure of a bad case of bee-stings is to fill the patient up with whisky. Dr. Gallup says, in the *A. B. J.*, that a wet-sheet pack is more harmless, and very effective. Horses badly stung can be treated in the same way. That is a good thing for all Californians to remember, for there is a number of horses stung to death in this State every year. Even rattlesnake bites are successfully treated with the cold-water method. Hurrah for cold water! [Here too—hip! hip!—ED.]

We believe that there is not an amateur bee-keeper in California. If there is one we hope he will send in his name. We should like to point with pride to such a curiosity, especially if he would come down with the cash every time in good English style. Now just look at these figures; this, Los Angeles Co., has about 300 bee-keepers; only 25 of this number were in attendance at our State Association. At the last County Association meeting there were not enough present to form a quorum for the election of officers; only 10 necessary for a quorum. The bee-keepers are not taking as much interest in the organizations as they should.

I wish to inquire if anybody knows more than I do about the effect of the X ray on honey. At an experimental lecture upon the X ray in this city the lecturer requested any person who had an article that he wished to place between the ray and the screen to do so. I had a mailing-block in my pocket, in which there were two bottles of honey. This was held up so that the ray had a fair chance at it. The block did not appear on the screen, but the two bottles stood out in bold relief. As to the effect on the honey, I did not see at the time that there was any difference; but that honey has not granulated up to date, and the experiment was made some four months ago. Will some one who has an X ray handy try the experiment upon various grades of honey, and honey that will soon granulate? The wonderful ray may have some effect in preventing molecular change.

It seems rather queer that some of our great bee-men should advocate the cumbersome cleat on hives, and prefer them to handholes (see *Straw* on page 166). The main use for it seems to be to carry the hives into the cellar. When I used to do such things in York State I could carry the hive, and with more comfort to myself and the bees, by grasping the

hive at the bottom. When moving bees the cleat is a downright nuisance. In those immense loads that Mr. Mendleson moves, those cleats would take the space of twenty hives. Anybody can see at a glance that the handhole is a decided improvement—neat, inexpensive, and out of the way. Bee-men out this way want handholes in their hives, supers, shipping-cases, and cases for cans. The cleat is decidedly a back number, and Dr. Miller ought to *know that*. [I smiled another big grin when I read this. I hadn't thought of it before, but those naughty cleats must take up much valuable room at times.—ED.]

You would not expect that much unripe thin honey would be produced. You would naturally expect that a bee-keeper would think it for his interest to produce honey of the very best quality; but the contrary is too often the case in this State. Here are the excuses put forward by those who persist in producing unripe honey.

1. Thin unripe honey is a grade lighter in color than it would be if it remained on the hive until it becomes ripened.
2. We get more of it.
3. There is no uncapping, and it is less work.

That these reasons are fallacious the following will show:

Thin honey is liable to sour, and more or less of it will be a dead loss. The flavor is raw and unpalatable, and people who buy it once will not buy it again.

If more gallons are produced it is lighter in weight, occupies more cans; better let it ripen.

It is certainly easier work to extract combs that are not capped, but your cappings will give you good returns for the labor in the beautiful wax produced.

To get right down to the bottom facts of the case, it is pure shiftlessness to produce unripe honey.

I have a great respect for anybody who lives in my native State of New York. They do things about right back there; but somehow that Coggs shall way of managing bees (see page 170) does not seem exactly right. There is a careful way and a rough way to do things, and in these times of wars and rumors of wars the careful way is considered the most civilized. Now, we guarantee that a careful bee-man would get just as much honey from his apiary, the surroundings would look better, the hives last longer, and the man feel better. The difference between the careful and rough handling of bees is often noticeable in this State, and our most successful bee-keepers are the ones who use a considerate amount of care. And now, Mr. Editor, I wish to ask if you really enjoyed such management, and are you going to run your apiary on the tip-over-kick-over plan hereafter? Another matter, there must have been thousands of bees in the honey; do you think it was improved thereby? Order is the first law of heaven, and it applies in the running of bees as well as in other places. I hope that Mr. C. will not shy one of those kicks at me. [I gave the Coggs shall method without prejudice or favor. No, I

don't think I'd like to work that way. It seems to me he would get as much honey with almost as little labor not to use the kick-over plan.—ED.]



BROOD-COMBS.

Old Renewed by Bees; Spacing, etc.

BY R. C. AIKIN.

Much has been said about the age of brood-combs, and as to when they should be renewed. There seems to be a prevailing opinion that combs can be and are used twenty—yes, forty or fifty years, and still be good. I am not going to say to what age a comb may be used without renewing, for I do not know.

In melting old combs I have noticed frequently the cell bases were very thick, while the side walls seemed never to increase in thickness to any thing near the same degree. I have sometimes wondered why this was so. I could see some reason for an accumulation in the bottoms of cells while a bee was growing therein, but I could not understand why, under the law of gravity, such accumulation did not settle more to the *lower* side rather than to the midrib, or cell base, nor why the bees did not rake out all such accumulations as soon as the cell was vacated.

At this point I stopped writing, and spent some time in dissecting some old brood-comb. A simple cutting through the comb, exposing the cells so as to be viewed from the edge of the comb, showed very clearly that the bases of the cells were from two to four times as thick as the side walls. For reasons that will presently appear I expected to find that these thick bases were made up largely of small cup-like sections of cocoons, the top part or side walls of the cocoons having been removed. Having no magnifying-glass and delicate tools to handle these very fine films composing the cocoons, I was unable to determine fully this point; and while there appeared to be some such construction, the principal thickening seemed to be caused by deposits of some substance much like pollen—I suppose the excrement of the maturing bee, or a residuum of the food with which it was nourished. While I could not determine its composition, there was no trouble at all to see that it was not all cocoon filament. This excrement or residuum in the bases was evidently deposited there during the larval state of the maturing bee, at least before the spinning of the cocoon, so when the cocoon was finished the substance was beneath, and could not be removed with-

out removing also the cocoon; hence the rapid thickening of the bases.

Four or five years ago, at a time when little or no honey was coming in, and when many colonies were without laying queens (having been unqueened, and young queens not yet laying), I noticed that about some entrances there was a great litter as if a mouse were in the hive gnawing at the combs. So great was the resemblance, with only a casual glance, that, had it been at a time when the hive would not be full of bees, and at a season when mice were likely to be in the hives, I should have decided at once that it was the work of a mouse. I determined at once to know what was going on there, and on opening the hive I found the bees tearing down the cells of old brood-combs right in the heart of the brood-nest, no brood being there because the queen was not laying.

Here was a case in which the bees were renewing their old brood-combs. The cells were gnawed down to the base and being rebuilt. I think I have a faint recollection of previously seeing the evidence of this work at hive entrances; and now having caught on to the fact I have many times since observed it in many colonies. Sometimes even the bases of cells are removed and a patch of new comb built in, though I think the rule is to rebuild just the cell-walls. This work must necessarily be done a little at a time, and so as to be easily unobserved. There is usually but a comparatively small portion of the comb at any one time free of honey, pollen, or brood, so that it can be operated upon, and often the bees may be too busy at other work to accomplish the job. I have most frequently observed it in the interval between the unqueening and the fertilizing of the young queen, and to the extent of probably 25 to 50 square inches at one time.

Lest you may think I am mistaken in this I will give very strong corroborating evidence. Just one week ago, while at our State convention, our secretary, Mr. Frank Rauchfuss, put the question as to how long a brood-comb is good without renewing. He detailed exactly the experience I had gone through with, saying that he and his brother, who is associated with him in the business, discovered the mouse-like cutting on and about the alighting-board, but found, as I had, that it was just the bees renewing the old heavy brood-combs. I think some writer has previously referred to this, though I can not now recall certainly the matter.

Since, then, bees do renew combs, is it not probable that these very old combs we so frequently read about are not nearly so old as thought to be? I am now firmly convinced that the bees will renew any comb that becomes too much reduced because of the cocoons. In the comb I have just been dissecting, the cells seemed to be lined with from five to ten cocoons, approximately. I examined both dry comb and cooked, and thoroughly water-soaked comb, and in both cases I could peel off the cocoons till I came to the original wall. Five months' breeding in a comb would mean 20 weeks—time for six

broods to have hatched in it, leaving six cocoons. Multiply this by 20 years, and you can see at once that at a very conservative estimate there would accumulate at least 120 cocoons in at least a part of the cells in a brood-nest center, which means that the diameter of that cell is reduced by 240 thicknesses of cocoon. I know they are very thin, but not so thin as to be invisible to the naked eye, and must very materially reduce the size of a cell if allowed to remain. Here is a job for scientists who possess delicate tools.

SPACING BROOD-COMBS.

It seems that the majority now use $1\frac{3}{8}$ as the distance from center to center. I understand that the Root goods go out that way unless otherwise ordered; and if so, that means that a large per cent in use are so spaced, even if no other manufacturers use that distance. If loose hanging frames can be a success, spaced $1\frac{3}{8}$, why can not self-spacing frames with true combs be a success, spaced even to $1\frac{1}{4}$?

I have about 100 chaff hives built for 9 frames spaced $1\frac{1}{2}$, the hive being $13\frac{1}{2}$ wide. Practically, 9 frames in $13\frac{1}{2}$ inches is a trifle less than $1\frac{1}{2}$ spacing, because a trifle more room is needed on the outside of the outer combs, counting from centers, else the spacing at these points would not be the same as between two combs. Instead, however, of using the 9 frames in the $13\frac{1}{2}$ inches, I have culled out crooked combs, and, when not full of honey, have crowded straight ones till I have in either the tenth comb or a dummy. Yes, I have even crowded a number till I have in a dummy, made by nailing common shingles on the outside of an ordinary $\frac{3}{8}$ -thick frame, in a few instances using two of these thick dummies and eight combs.

These dummies are not less than $1\frac{1}{4}$ thick, and a bee-space of $\frac{1}{4}$ or more behind them, leaving 12 inches for 9 frames, just $1\frac{1}{2}$ -inch spacing. Some of the dummies are even thicker than $1\frac{1}{4}$, and sometimes crowded in, leaving quite a space behind them. By actual measurement by rule I found many frames spaced not a bit over $1\frac{1}{4}$ inches. For several seasons I have in this way used many of these hives spaced anywhere from less than $1\frac{1}{4}$ to $1\frac{1}{2}$. I spaced so closely for two or more reasons. The frames are old-style $\frac{3}{8} \times \frac{3}{8}$ bars, cut from ordinary lumber. So long as the combs were built in the center, and true, and had brood only in them, they worked all right. A brood-comb, when sealed, is from $\frac{7}{8}$ to a plump inch in thickness; so, when occupied by brood, the comb was fully as thick as the top-bar was wide.

Now, whenever honey was stored in these combs the cells were lengthened until comb-faces were usually not over $\frac{1}{4}$ inch apart, thus making the average thickness of the combs of sealed honey $1\frac{1}{4}$ inch thick, projecting $\frac{1}{8}$ past the top-bar on either side. If, however, a comb filled with honey joined one with brood, the honey-cells would be still more lengthened, until, with the $1\frac{1}{2}$ spacing, the comb containing honey would be $1\frac{1}{2}$ inches thick, making the honey-cells stand out flush from

the top-bar, $1\frac{3}{8}$, wavy combs showing even greater protruding in some cases. The direct result of these combs being thicker than the top-bars are wide is the building up past, over, and all around the tops, fastening all solid to sections, honey-boards, cover-boards, or whatever was above. Like work was also done around end-bars to hive-ends.

The matter stood just this way: I must endure the *awful, awful* burr-combs; make an entire change of frames, or else close space till I could afford a change, and I chose the close spacing. Those who use a loose frame know that the bottom spacing is very uncertain. A very few cases occurred in which two combs, because of crooked combs, or swinging toward each other, came so close that the cells on one had to be reduced to less than brood depth in order to allow of brood in the other, which shows the limit of close spacing, and the disadvantages of crooked combs and loose frames.

I said the thickness of a sealed comb of brood (I speak of worker, drone-brood comb is thicker) is $\frac{7}{8}$ to 1 inch. New comb is about $\frac{7}{8}$, while old comb may reach the one-inch mark. I therefore reason that the width of top-bars should be one inch. The spaces between comb faces, when filled with honey, and sealed, may be said to be $\frac{1}{4}$ inch. They will frequently seal at $\frac{3}{8}$ if the honey-supply is short and comb plentiful; but when comb is built just as needed, and also, frequently, even when there is a surplus of ready-built comb, the capped faces of store comb are but $\frac{1}{4}$ inch and less apart.

Suppose, then, brood-frames are spaced $1\frac{3}{8}$, the combs, when filled with honey, and sealed at $\frac{1}{4}$ inch apart, would be $1\frac{1}{8}$ thick. Since it frequently happens that a honey surface has for its neighbor a brood surface, the honey-cells may exceed somewhat the $1\frac{1}{8}$ mark. In order, therefore, to avoid the building of the comb thicker than the top-bars, and therefore up past them into burr-combs, the top-bar should be in width the thickness of the thickest comb. Since, for other reasons, it seems best to have the top-bars no wider than the thickness of a brood-comb, it seems to me that even closer spacing than $1\frac{3}{8}$ would be advisable. A $1\frac{1}{4}$ spacing would allow of a plump $\frac{1}{4}$ inch between worker-brood faces, with perfectly true wired combs, and thus, no matter whether filled with brood or honey, the combs would at all times remain at the same thickness, hence at all times perfectly interchangeable, even with self-spacing frames, whether Hoffman or other style.

After much thinking, figuring, and experimenting, I have decided to adopt an inch top-bar, and not exceed $1\frac{1}{2}$ spacing. I know that $1\frac{1}{4}$ spacing works, for I have tried it; and, if I remember rightly, Mr. J. E. Pond has advocated it for several years.

Loveland, Col.

[Cheshire has a good deal to say on the subject of cocoons in worker comb, and how the bases of the cells are filled up in time with deposits. While they are made up of the cast-off skins, there is also quite a thickening

resulting from excreta of the larvæ. So far your observation quite agrees with what Cheshire has to say on the subject.

That bees may entirely renew old brood-combs every few years is a rather new idea, and yet it must be quite within the range of probability. One of two things must be true: Either bees actually carry out all the cocoons and the deposits in the bases resulting from a series of broodings, or else they tear down the whole business little by little and renew it.

With regard to the spacing of frames, along about 1890 I went over this question very thoroughly. At that time we were considering the advisability of making and putting on the market spaced frames. Some used the $1\frac{1}{2}$ -inch center-to-center distance; but more used the $1\frac{3}{8}$, because by it they secured less of drone comb and more of worker; and that, moreover, the face of the honey was more even in capping, and the honey itself better ripened. Quite a number also at that time went so far as to argue that $1\frac{1}{4}$ -inch spacing was better still, because it would exclude all drone comb; that nothing but worker brood could be reared. It was also urged that it did away to a great extent with the nuisance of burr and brace combs. Prominent among those who held to this idea was H. R. Boardman, of East Townsend, Ohio. He could largely dispense with burr-combs, and still use his old $\frac{7}{8}$ -inch-wide top-bars.

I must acknowledge that at the time my preferences were for the very narrow spacing; but it seemed better to make our top-bars $1\frac{1}{8}$ wide, and use $1\frac{3}{8}$, on the ground that it was a golden mean; that $1\frac{1}{4}$ spacing would be too radical for many who would prefer $1\frac{1}{2}$, but who would consent to take $1\frac{3}{8}$ because they could not get any thing else. It is the old question that the supply-dealer has to sometimes straddle the fence, and adopt, not what he really thinks the best, and which will not sell, but a compromise that *will* sell.—ED.]



NOTES OF TRAVEL AMONG BEE-KEEPERS OF YORK STATE.

Mr. David Coggsball; Mr. Harry S. Howe, the Lightning Operator and Champion Hill-climber on the Bicycle.

BY E. R. ROOT.

After GLEANINGS for March 1 had reached the Coggsballs I received the following note from Mr. Harry S. Howe, one of their "lightning operators." As it may possibly explain why Mr. Coggsball's bees stung so like fury the day I was there, I will give it right here:

Friend Root:—We were all much interested in your report of the trip to the Varna yard. Of course, the bees were cross; and, besides, I think the boys stirred them up some for your special benefit. About the time the last copy of GLEANINGS got in circulation,

the help Mr. C. expected for the summer began to telegraph that they had "backed out." The reason those bees could not sting the boys on the hands was because they could not get hold of anything to hold themselves down. By shaving or singeing all the hair from the backs of our hands, we fix it so they only slip up when they try to sting.

West Groton, N. Y., March 6. HARRY S. HOWE.

Several times I had a sort of feeling that the bees were "hared up" for my particular benefit; but I was afterward told by neighbors and local bee-keepers that Mr. Coggs shall was in the habit of working the bees in this way, whether it was during the robbing season or during the honey-flow. His motto seemed to be, the greatest amount of honey with the least expenditure of labor, the matter of stings being of only secondary consideration.

Speaking of stings reminds me of bee-suits. The accompanying illustration shows Mr. David Coggs shall, a brother of W. L., rigged out in his bee-proof sting-proof suit. The majority of bee-keepers seem to think that gloves are unnecessary; but let me say that, if they worked on the Coggs shall plan, they would find gloves almost indispensable. Notwithstanding, one of the men worked the bees barehanded; but, my! oh my! I would not

have done it for all the bees in the yard.

Mr. David Coggs shall (of whose face the reader will get a dim outline behind the veil), like his brother, is not only a prosperous farmer, living in a fine country residence (about a quarter of a mile from his brother's), but also an extensive bee-keeper. He operates some 600 or 700 colonies in perhaps six or seven apiaries. I did not have time to look over any of his yards; and in any event, I assumed that he worked his bees much as did his brother—on the lightning-kick-snap-bang-get-there plan. His sting-proof bee-suit is certainly suggestive of that assumption.

Mr. Coggs shall has had different men and boys work for him in his apiaries; but he considers Mr. Howe, the young man to whom I have referred several times, as being his fastest lightning operator. Harry, at the time of my visit to the Coggs shalls', was in the bicycle business at Ithaca, N. Y. He taught school in winter, repaired and made bicycles, and ran one or two apiaries of his own in the vicinity of Cornell University. I have before said that

he was a bicycle enthusiast, and, of course, he and I found companionship mutually agreeable. When we were tired of talking about bees we would talk about "bikes."

At the time I arrived in Ithaca, I had taken a forty-mile ride from Romulus, N. Y., over the hills to Ithaca, better known as the home of Cornell University. I had trundled over the hills until my legs were tired—yes, weak-kneed, knock kneed, and every other kind of tired. Arriving at Ithaca I sought the nearest depot, and was there informed that I would have to go to the *other* depot, upon the hill. I followed in the direction pointed out, supposing that, of course, I could reach it in a short time. I started to ride up the hill; but passers-by began to call out, "Hey, there! going to climb that hill? Better get off 'n' walk—you'll live longer, stranger;" and—I *did*!

I kept on going up, up, up, until it seemed as if I could not even *push* my wheel, even on foot. I hurried so as to catch the train that was to come soon at the other station; but after half an hour's hard toil I arrived in sight of the station, more dead than alive, just as the train was pulling out. I then fell to wondering why York State had so many mean hills, and whether *any* mortal had *ever* climbed *that* hill on a bicycle, for it is indeed a series of hills, one on top of the other. To my great astonishment I learned that there was at least one who had done it, and that was my friend Harry Howe, who had performed the feat, not once, but several times, on a bicycle of *his own make*.

The accompanying illustration shows Harry, and the wheel that made that remarkable climb. My camera tried to catch him on the



HARRY S. HOWE, OF ITHACA, N. Y.

wing; but it was only a streak on the film. The only shot I can present to you is the one

that the same camera took some months later, when the weather had turned considerably colder.

I should like to tell you, if I could, some of the remarkable records Harry has made in extracting honey; but, as I have said of the records in general, made at Mr. Coggs's apiaries, I have forgotten just what they were; and, even if I could tell you, you might think I was telling you a "fish story." However, if Mr. Coggs will submit the series of records made by himself, Harry, and some of his other men, I should be glad to publish them.

DEAD BEES ON CELLAR BOTTOM.

A Worked-out Proposition: Some Interesting Data on Indoor Wintering; Temperature of Cellar and Temperature of Cluster, etc.

BY C. C. MILLER.

You never spoke truer words, Mr. Editor, than when, on page 141, you said it is hard to tell how many bees should be swept from cellar bottom where bees are kept. You said 75 colonies might give only a pint a month, and they might give a bushel. You might have added that the pint a month might be with the better wintering, or it might be that the bees were wintering better with the bushel. For bees may be dying off rapidly in a hive, and none of them come out of the hive. Probably it's better to have them on the cellar bottom than on the floor of the hive.

There's a difference in colonies. I've just been down cellar; and while I find the floor of most hives comparatively clean, a few of them have mounds of dead bees, in two or three cases the mound rising two inches high and touching the bottom-bars. In one case the entrance was filled with bees almost entirely, the upper half of the entrance, which is two inches deep, being filled with live bees and the lower half dead. The live and the dead bees form one continuous mass. This is a very unusual case, for generally no dead bees are suffered near the cluster.

Nov. 17, 1896, I cellared 260 colonies. After 110 days I swept what I roughly estimated at 48 quarts of dead bees; 23 days later, about 22 quarts. That makes, during the first 110 days, about 29.3 cubic inches per day; during the later 23 days, 64.3 cubic inches per day.

Nov. 23, 1897, I cellared 295 colonies. After 70 days I swept out 23 qts., carefully measured; 29 days later, 35 qts.; 22 cubic inches per day in the first part, 81 cubic inches per day in the last part.

A much more marked difference would probably be shown if the first ten days of the winter should be compared with the last ten days. Likely ten times as many dead bees would be swept out the last ten days as in the first ten days.

TEMPERATURE OF BEES IN WINTER.

Not long ago I said something about the temperature of the brood-nest in winter, giving a possible explanation for the fact that outdoor colonies begin to breed in February,

and cellared bees not till set out in April. Hasty, commenting upon it in *Review*, thinks my explanation is perhaps "nearer to being a well-reasoned-at proposition than a mere chance shot." Having gathered what data I can from different sources I'd like to make it, instead of a "well-reasoned-at," at least a tolerably well-reasoned *out* proposition.

The bee is warm-blooded. Seven bees taken from a colony in cellar showed a temperature of 81.5°. Some bees inclosed in a glass, warmed to 104°, were all dead except one at the end of 90 minutes, the temperature of the surviving bee being raised to 95°. Some bees that were torpid in a temperature of 47.7°, but brought to life in an atmosphere of 59°, showed an interior heat of 77°. Results obtained by M. Cisielsky were somewhat different, as he obtained 95° as the normal temperature in the body of a bee.

The effort of the bees seems to be to keep the temperature of the cluster from going below 50° to 53° at any time. Notice that the temperature of the cluster is a separate affair from the temperature of the individual bee, just as the temperature of the atmosphere of a crowded room is not the same thing as the temperature of the human bodies in the room. Should the temperature of the cluster, that is, of the air immediately surrounding each individual bee, fall a little way below 50° for a short time, torpor ensues, leading to death if the temperature be continued. But the temperature of the body of a bee can not be allowed to sink to 50°. Torpor and death will come with a temperature less or more continued at 75°.

How is it that, in a temperature of 50°, the individual bee keeps up a temperature of 85° or 95°? Just the same as a man in a zero temperature keeps his blood something like a hundred degrees higher by means of the fuel burned up in his body. The man may help the matter, too, by kicking his heels and flinging his arms. So can the bee. Now, suppose the heat of the cluster is found to be falling below 50°. What's to be done? Why, there's a stir in the camp; possibly the outside bees, feeling the cold, break for the middle of the cluster; the stir and exercise increase the temperature, increased consumption keeping pace with it. Only a little of this stir will be needed if the temperature is only a little below 50°, increasing as the temperature sinks, making it necessary to have the center of the cluster a good deal above the 50° at which the outer part of the cluster must be kept.

The colder the winds blow about our dwellings, the better we keep the fires in our stoves. So it is in the bees' dwellings. In order to have the outer part of the cluster keep up to 50° when the zero air about it is cooling it off every minute, the fires must be boomed in the center of the cluster. So when it gets cold enough outside the cluster, the center will run up to 86° or more, making it warm enough for the queen to commence laying, as she is likely to do in February if colonies are wintered out. Then when breeding has commenced, the proper temperature must be kept up continuously, more fuel must be used, the ashes

accumulate in the shape of bowel contents, tending toward diarrhea and destruction.

So you see that we are specially to strive to keep the center of the cluster cool by keeping warm the air surrounding the cluster. Packing, protection against cold winds, and that sort of thing, are plainly indicated when bees are wintered out. In the cellar it has been generally considered, on grounds deduced from actual practice and observation, that the air outside the cluster should be 45°. If much above this point, activity commences, the heat of the cluster is increased, and increased heat and activity point toward the same result as before. Disturbance of the colony by jarring, or in any way, whether in or out doors, makes the tendency greater toward increased heat in cluster.

Now comes a practical question: We have for a long time been accustomed to think and speak of 45° as being the proper temperature of a cellar to keep the bees as nearly dormant as possible. But the bees seem to have settled upon 50° as the proper temperature of the cluster at which they will be most nearly dormant. How about that difference of 5°? Why not keep the cellar at 50°, and save the bees the trouble of doing any thing to raise the temperature? Suppose we try it. Fix the air of the cellar at 50°. Now, the outside of the cluster is warm enough without stirring up the chunks in the center. But it must be remembered that, in each bee, there is a temperature of more than 80°, a temperature necessary for the continuance of life. You can not stop the tendency to equalization of temperature between the bodies of the bees and the air in the cluster, so when there's nothing lower than 50° outside the cluster, the heat from the bodies of the bees will run the heat of the cluster above 50°. Get the idea? So long as the fires are kept up inside, the air outside must be somewhat below the temperature desired for the air in the cluster, so 45° outside is needed to keep the cluster as low as 50°.

I wouldn't like to vouch for the exactness of the figures I've used, but I believe the general principles are so in accordance with the truth that my esteemed friend E. E. Hasty may label it a "worked-out proposition."

Marengo, Ill.

[The doctor, instead of saying, "I don't know," has told us a number of interesting things he *does* know. Nine times out of ten, when he says "don't know" he does "know" I *know* he knows. Throw away your modesty of statement, doctor, "don't know," and give us hard facts like the above. I've almost a notion to put them (the facts) in permanent form in the A B C of Bee Culture.—Ed.]

WORK AMONG THE BEES.

The Big Wages of Another Bee-keeper.

BY E. S. ARWINE.

Mr. Editor:—As you seem puzzled, and continue to prod Dr. Miller about that honey crop, I thought I might shed a little light on

the subject. The first two years of my residence in California I had charge of the apiary of W. S. Hathaway & Co., in San Bernardino Co., run exclusively for comb honey. The first year, 1888, I took 16,240 lbs. in 2-lb. sections, from 184 swarms, spring count. I commenced work March 16, and closed Aug. 6. During that time I built a dam across a little creek, cut a ditch, with pick and shovel, about half a mile long, to carry 16 miner's inches of water. I broke the ground, and planted about 2½ acres of alfalfa, and kept it irrigated until July 15. This work occupied 20 days, leaving me 104 days in the apiary. I did not work Sundays, as I am a Christian, and keep the Lord's day. To this must be added help from my children, equivalent to 40 days' work for myself, making a total of 144 days. During this time I added the super to 140 hives (the others had supers left on from the previous season); removed them at the close of the harvest, and left every thing in ship-shape condition for winter. That season I took 16,240 lbs., or an average of 87½ lbs. per colony, spring count. We nailed all the sections except about 250 or 300, left over from former season, and all the shipping-crates, and made a few supers, about 15 in all. My heaviest days' work that year was removing 896 lbs. and replacing it with a like number of empty sections.

In 1889 I reached the apiary March 20, and closed the season Aug. 12. Excluding Sunday, which I did not work, gave me 124 days; to this must be added 50 days' work by my 12-year-old boy, equal to, say, 35 days for myself, making a total of 159 days. But six of these days I was out of the apiary, leaving net work 153 days, averaging 9½ hours. I took that year, 1889, in all, 16,766 lbs. I had five colonies this year, with 1-lb. sections; the rest were 2-lb. sections. My heaviest day's work that year was removing 928 lbs., and putting on a like number of empty sections. The greatest yield of one colony was 192 lbs., comb, and smallest 56; average of the five swarms in 1-lb. sections, 92 lbs. The largest yield of one colony in 2-lb. sections was also 192 lbs.; smallest, 32; average 91 lbs. per colony, spring count, of 186 swarms. I had no bee-escapes, and the supers were all tall enough to hold two tiers of 2-lb. sections, except about a dozen which I made for single tiers. I also made by hand 5 hives and supers for 1-lb. sections. We nailed all these sections except the 460 1-lb. ones. I would rather fold 1500 1-lb. sections than nail 500 2-lbs., like those we used, as the following description of motions will show:

1. Pick up with left hand; 2. Grasp the other end with right hand; 3. Both hands bring ends together; 4. Press dovetails into position; 5. Place the section on the table. To nail sections requires four motions with left hand to pick up the four pieces; six motions to pick up six nails; six motions to place them in position; twelve taps with right hand to drive the six nails—one to start each nail, and one to drive it; one motion to take the section out of the nailing-frame, and one to place on the table, and one motion to turn the section over

to nail on both sides, making 31 movements, for nailing, against five for the one-piece; or, if we count the simultaneous motions of both hands as at three and four, it will be 7 to 31.

Friend Ernest, if I were a sporting fellow I would wager a pink bean against a black-eyed pea that I could take any bee-yard that will not carry over 200 colonies without overstocking, and do all the work necessary—that is, put all the sections together, put in all foundation, put the sections on the hives, and remove the same to the amount of 100 1-lb. sections to each hive, clean all the sections, nail all the shipping-cases, grade and put the honey in the cases, marking the grade on each case, my supplies being all on hand when the weather is warm enough in the spring for soft maple to begin to bloom, and have all done up in good order, and the bees ready for winter by Nov. 15. I would as lief do the work where the average is 90 to 100 lbs. per colony as where it would be only 25 or 30, provided the bees were as long in gathering the small amount as they would be to secure the larger one. With the larger yield, propolis would be at a minimum, and at the maximum with smaller. With the bountiful yield I could remove full supers; with the smaller I should have to remove one or two to a dozen or so from a hive to prevent travel-stains, and I have no doubt the exhalations from the cluster will in time stain the combs perceptibly.

In the larger yield, my compensation, or that of my employer, would be much greater as the case might be. If I work for a man I want him to get more out of my labor than barely enough to compensate me for doing it. The greater his profit, the more is my rejoicing.

Dove, Cal., Dec. 10.

[If I figure correctly your bees in 1889 (allowing 10c per lb. for comb honey) paid you over \$18.00 per day for every day given to them. In 1888 they returned you something like \$15.00 per day. But—ten years ago you probably realized a much higher price than 10 cts.—just how much I can not say. But the results beat Dr. Miller by considerable. His rate was 500 per day. We thought his record was big and the wages too. Nailed sections—I don't see how any one can afford to fuss with them.—ED.]

THE PETTIT DIVIDER.

Its Form of Construction; Size and Shape of Brood-nest.

BY S. T. PETTIT.

Mr. E. R. Root:—The dividers I sent you some time ago are not "exactly as I recommend them for 1898." The changes I purpose making from those of 1897 are these: First, the holes will be $\frac{3}{8}$ instead of $\frac{5}{16}$; second, all the $\frac{1}{4}$ -inch slats except the two end ones will be superseded by slats one inch long, nailed at the edges of the divider; and, third, the thickness will be $\frac{1}{2}$ inch instead of $\frac{1}{8}$ inch, because the bees seem satisfied with that thick-

ness, and do not gnaw them as they sometimes do separators.

I have felt all along that it would be better if the slats were out of the way, so the bees could cluster together and have free passage from end to end and from section to section outside the divider, and, doubtless, practically as well as theoretically, the change will be an improvement; and, further, the inch slats will keep the divider rigidly in place. Suitable nails with $\frac{1}{4}$ -inch heads would be, perhaps, more convenient and more desirable.

Of course, the notches in the bottom side will not be necessary except when T tins are used. I will add that bees do not care very much, if, indeed, they care at all, to build their stores and brood nest in spherical form, as some have supposed. They build in that form because the conditions are favorable for so building, and not from instinct or choice.

The bees cluster in that form, and, consequently, the necessary even animal heat is there in that form, and so the work of comb-building proceeds downward and outward, and thus the spherical form is in a measure preserved. Change the form of the cluster, and the animal heat and comb-building in the new form will proceed just as rapidly as in spherical form. Following up these thoughts will help us to understand that a proper distribution of the bees by means of a properly constructed bottom-board, and its relations to the hive, and the large ventilation thus provided for is fully half the battle in the new system.

Make the bees snug and warm at the sides and corners of the supers; encourage plenty of bees, by the help of the divider, to stay there, and then as the bees, the heat, and the honey are lavishly supplied there, the conditions for good work are present, and it will be done there, regardless of shapes or forms.

I cover my supers with cushions, and the bees do not on cool nights shrink from corners and sides.

S. T. PETTIT.

Belmont, Ont., Can.

[As there has been considerable inquiry in regard to the Pettit divider, I asked friend P. to send me the latest form, or the one he would recommend. He did so, and I had an engraving made. It will be noticed that it is specially adapted for use in T supers, although it may be used in any form.



This same divider bee-spaced on both sides with cleats, A A, B B B, etc., would give excellent results when used with plain sections; in other words it might then be called the Pettit fence; but friend P. is not in favor of plain sections. In the last *Canadian Bee Journal* he calls them a "silly fad," and says that "the talk about less peep-holes and better-finished sections is all nonsense," and that

bee-keepers are "losing their heads." Suppose, friend P., I were to say the same thing of your statement, to the effect that sections next to your divider were better filled out was "all nonsense." The fact of the matter is, I believe there is something in your divider; and I also believe that, before the season goes by, if your prejudice does not run away with your ordinarily good judgment, you will be convinced that the plain section is not a "silly fad" any more than your divider. Why should it be? The fence as we now make it, and your divider, utilize one of the same principles—free communication in every direction.

I suppose friend Pettit bases his statement in the *Canadian Bee Journal* on his experience with a fence similar to what we use. A sample of this fence was sent us, but it was markedly defective in four important particulars; viz., width of slats (too narrow), space between slats (too wide), thickness of slats (too thick and too narrow), and poor workmanship.

With regard to the size and shape of the brood-chamber, and the importance of having it kept warm, I agree with you exactly.—ED.]

SPECIFIC GRAVITY.

What should be the Minimum Weight per Gallon that should be Allowed to go on the Market? Extracting before all the Honey is Sealed.

BY O. O. POPPLETON.

On page 126 Mr. Dan White tells of a man getting a larger yield of honey from about 90 colonies than almost any other person could have done, by extracting each hive every day. In the footnotes to the same article you suggest the adoption of a rule that no honey should be sold that weighs less than 11 lbs. per gallon. These two extracts open up a subject that I have wanted to say something about for years, ever since my Cuban bee-keeping experience.

It is generally supposed and conceded by bee-keepers that a much larger yield of honey can be obtained by extracting before honey is sealed, than by waiting until a part or all is sealed. Is this idea correct? I think not.

The main honey-bearing flora in Cuba, a species of morningglory, has some peculiar habits of flowering that enable one to make observations that are difficult to make in this country. Its flowers last one day only, a new set of bloom coming out each successive day. The amount of bloom varies each day, but rarely if ever two days alike. I have seen the hedges, stone fences, etc., look almost like snowbanks one day with the profusion of bloom; the next day I have had to walk rods to find a single flower; the next day, a half or a quarter the maximum number would be out, and so on through the entire blooming season. We had over 400 colonies in one apiary, enough to gather all the honey in the field; and I could tell each morning, by noting the amount of bloom out that day, almost exactly the amount of honey that would be gathered during the

day, as shown by the hive on scales. I weighed the hive each evening after bees were all in from the field, again in the morning before they had started out to work, the difference in the night and morning weights showing the amount of shrinkage of the newly gathered honey. A study of the record of these weights, made after the close of the honey season, showed two facts—one, that the shrinkage from first-gathered to well-ripened honey was about one-fourth; the other was that this shrinkage almost all took place during the first night, only about a tenth of the total shrinkage occurring after the first night. The peculiar honey-flow, and our having enough bees to gather all the honey in the flowers, brought out the above facts much more clearly and positively than I have ever been able to observe them here in the States.

To enable that man Mr. White speaks of to gain very much in quantity would require that he extract his entire 90 colonies *late* each day, after the bulk of that day's yield had been gathered; and even then, if the extracting were done while the bees were still at work, in my opinion the loss caused by disturbing the bees would almost or quite equal the gain.

Cuban honey has about the same body as has our white-clover honey; but honey from basswood is usually much thinner when first gathered, and loses more in ripening.

Another thing I noticed was that the amount of honey in the hive had no influence on the amount of honey the bees would gather, other conditions being alike. It made no difference in the amount of honey gathered by the bees, whether there was 5 or 50 lbs. of honey in the hive, so there was plenty of storing-room yet in the hive.

The note of warning given by Mr. White against our taking out unripe honey is one that can not be sounded too often nor too long, and I hope that what I have written will help to do away with the mistaken idea that a larger quantity of honey can be had by taking it out while yet in an unripe condition.

Three or four years ago a Canadian writer, I don't remember who, wrote an article on the "Weight of Extracted Honey." Two of his statements caught my attention. One was that "Cuban honey weighed 10½ lbs. to the gallon," the other was that "good honey should weigh about 13½ lbs. to the gallon." I don't believe that any one ever saw any thing that could possibly be called honey that weighed as little as 10½ lbs. per gallon; nor, on the other hand, do I think any honey weighs as much as 13½ lbs. This is only my opinion. I have never had the facilities to weigh accurately any samples—that is, with scientific accuracy. One lot of over 3000 gallons of Cuban honey we sent to this country, weighed 11 lbs. 14 oz. to the gallon; and my experience in handling honey makes me think that is about the average weight of a good article of honey. I doubt whether any good honey ever varies more than half a pound either way from that figure.

Assuming that an article of well-ripened honey weighs 12 lbs. to the gallon, which I think is about correct, and water 8 lbs., it will

be seen that honey weighing $10\frac{1}{2}$ lbs. will need be nearly one-half water; and honey weighing 11 lbs., the limit suggested by the editor, will be $\frac{3}{4}$ honey and $\frac{1}{4}$ water. This is, I think, entirely inadmissible, and I would suggest $11\frac{1}{2}$ lbs. to the gallon as the lowest limit of merchantable honey.

I wish, Mr. Editor, that you would, some time or other, cause accurate weights to be taken of different grades of honey, so we can have facts, not opinions, to base any future arguments on.

Stuart, Fla.

[I suggested 11 lbs. as the lowest limit, because the great majority of all honeys runs about that weight to the gallon. I do not know whether this average is because beekeepers have a habit or a general rule of extracting before *all* the honey is capped, or because the honey would not run any heavier than that if it were all capped over. I am afraid if we put $11\frac{1}{2}$ as the lowest limit it would throw out two thirds of the honey. We have weighed honey, and found on the average that one of good heavy body will run about 12 lbs. to the gallon; and in our experience the difference between medium honey and thick is the difference between 11 and 12 pounds. That which I have "over at the house," and which is so thick it is almost like chewing wax, runs nearly 13 lbs. to the gallon. If it were thicker than this, it would be more like syrup boiled down, or what is commonly termed "wax."]

QUEENS IN POPULOUS COLONIES.

A Simple and Reliable Method for Finding them without Wasting Time in Pulling over the Combs.

BY F. GREINER.

To find the queens in very populous colonies of black bees is not always an easy task; and, as the editor says, it is well to have two pairs of good eyes to do it. Hybrid queens are, generally speaking, not much easier to find, except as their color makes them more conspicuous.

I have never yet made it a point to breed up to pure stock; in fact, black blood predominates at present in my yard; consequently I have had some experience in hunting out black queens. If I do not *have* to have a certain queen that minute or hour, my mode of operation is this:

Some time in the forenoon I remove a comb from the side of the brood-chamber containing the queen that is to be captured, and insert instead a nice comb with a considerable amount of drone comb; close the hive, and leave it entirely alone for 24 hours, or perhaps 36, depending somewhat on the condition of the comb given. The bees, very eager to raise drones, and not having any other drone comb of any amount in their hive, go to work at once, fitting and preparing the cells in the inserted comb for the reception of eggs; and when, on the next day, the hive is very carefully opened (with as little smoking as possible), and this comb quickly taken out, our

sought-for queen will generally be found on it. If I do not find her the first time, I return the comb and close the hive, wait ten or twelve hours, and make a second search—yes, perhaps a third one. By the amount of work done on the comb after the lapse of the first 24 hours, whether it is all cleaned up—whether any, many, or no eggs have been deposited in it, the experienced apiarist can judge with a degree of certainty how soon he may expect the queen to begin or to continue her work on said comb, and he can make his calculations accordingly.

This tactics seldom fails to gain the desired point. Nine times out of ten the queen is found by the time the hive is opened the second time after the insertion of the drone comb; and the time actually required to do the whole work need not exceed ten minutes. My last resort is the entrance-guard plan as the editor explains on page 850.

Naples, N. Y., Jan. 4.

[I believe your plan, friend Greiner, will work tiptop. In the busy rush of work in the apiary I always dread hunting for queens in strong colonies. Sometimes I may find Her Majesty on the first comb; but more than likely she will be on the last one. If I can not find her the first time going through the hive, I shut it up and clamp a guard over the entrance, and then say to the bees, "Swarm if you want to, but you can not take your queen." The only reason why I care to find a queen in the midst of the honey-flow is to clip her wings. Of course, some may say queens ought to be hunted up and clipped in early spring, when they are not very populous; but nearly every season we buy strong colonies along at the approach of the honey-flow, and of course there are only two plans open to us—find the queen and clip her wings, or put entrance-guards in front of the entrance. I prefer clipping when I can do it without too much work.—Ed.]

MAPLE SYRUP MADE OF SUGAR AND "HONEY."

Since you don't seem to fancy the corncob recipe for making maple syrup I will give you mine "free gratis." Place one cup granulated sugar in a sauce-pan; add about half a cup of water (less if to be thick); let boil a few minutes, then add two cups best white-clover honey, remove from the fire, and flavor with a scant teaspoonful of vanilla.

Every one pronounces this "splendid," and it is an agreeable change for breakfast cakes when one has become tired of honey.

We discovered this recipe while making Dr. Miller's caramels, the flavor of which reminded us as being much like the maple wax we used to make years ago when making maple syrup.

F. W. STEVENS.

Moore's Hill, Ind.

[All right, friend S.; give us the white-clover honey for flavoring, instead of the corncob juice, by all means; and it has been many times suggested that such a mixture is milder and pleasanter than pure honey; but let the mixing be done *at home*.—A. I. R.]

MONEY IN BEES.

How to Find it; How the Disagreeable Feature of Peddling may be Overcome; Getting Prospective Customers to Taste, the Secret of Making Sales.

BY H. D. BURRELL.

How to dispose of the honey crop profitably is becoming a serious problem with most beekeepers. Not many years ago it was easy to raise comb honey, ship it to some commission house in a near-by city, and realize 16 to 20 cents a pound for it. Now in many places most of the honey-producing timber is gone, and waste lands reclaimed and cultivated. These causes, with frequent poor seasons, render the honey crop uncertain; and, worst of all, comb honey in the cities is quoted 7 to 12 cents.

Formerly I raised comb honey almost exclusively, and shipped nearly all of it to commission houses. But some years ago I unexpectedly had about a ton of autumn extracted honey to dispose of. Shipped to a commission house it would probably have netted 4 to 5 cents a pound, *some time*. I had never tried peddling honey, and was very much prejudiced against peddlers and peddling; but I wanted more for that honey. I loaded some of it into the wagon, put up in convenient packages for retailing, and started, though with much trepidation. I knew a few rebuffs would send that honey to the city for what it would bring. But I sold honey at nearly every house, over 300 lbs. the first day, and decided that peddling (honey at least) was not such bad business after all. Many neighbors and acquaintances who had passed by frequently for years and seen the sign, "Honey for Sale," but never bought a pound of my honey, bought freely when it was carried to them. And they didn't buy afterward, either, unless I carried it to them and asked them to buy.

The ton of honey was soon sold at 8 to 11 cents per pound, according to quantity wanted, and several thousand pounds more were bought and sold at a fair profit. Since that time I have raised mostly extracted honey, always retail it myself, and am getting the same prices now in these times of very low prices that I did ten years ago. Honey, if a good article, will sell itself almost anywhere, if given a fair chance. I have never found a place, in country or town, where it would not sell fairly well, any time of year, though in the fall is the best time to sell, in my experience, after the bulk of fruit is gone, and the many needs of the winter season have not yet taxed the pocket-book.

But I think I hear some one say, "I can't peddle;" or, "I won't stoop to peddling!" Now, neighbor, stop a minute, and listen. When I was young and green I tried "canvassing" for a book. For years after, I had a horror of peddling. When I came to keep bees, and have honey to sell, I would not even ask a merchant with whom I traded regularly to buy my honey. If any one but a commission man wanted any of it, he had to ask for

it. I am not a natural salesman, a poor talker—timid, diffident, and easily rebuffed. I can, however, sell an average of 100 pounds of honey a day in any fairly good farming country, and in villages and towns often much more. You will find selling your own honey different from selling books or notions. People will be glad to see you come. You need not lose one atom of your dignity, if it is of the self-respecting kind. If any one thinks any less of you for selling honey, provided you are polite and respectful, it will be some one whose opinion is not worth minding. Any one with a little tact and energy can dispose of 3000 to 5000 lbs. of good extracted honey at fair prices, at odd times in fall and winter, when time is not worth much, and much more can be sold by devoting more time to it.

Comb honey is not satisfactorily retailed, in my experience. It too easily gets to leaking, and is then mussy, and not attractive. Sell comb honey only by the case if at all. Perhaps I may be pardoned for saying, in such an article as this, that I have for many years kept from 50 to 195 colonies of bees, and have raised and sold over 60,000 pounds of honey, and bought and sold much besides. I write facts learned in the dear but thorough school of experience, and not plausible theories.

First, secure a good article of well-ripened extracted honey, and so care for it that it will remain good. My ways of doing this differ from the usual ones; but I will not take time now to explain. Perhaps in some future article I may do so if the editor wishes it.

When we are ready to sell, if the weather is mild attach a sliding faucet to a five-gallon screw-cap tin can of honey; place the can on the wagon-seat, the dish to be filled on platform scales underneath, and weigh out any quantity wanted. It is usually most satisfactory at this time of year to let the purchaser furnish the dish, then there is no package to pay for or return.

Some writers have advocated selling not less than one dollar's worth when selling honey direct to consumers. I can't agree with them. A small sale often paves the way to a large one later, and it always pays to be accommodating and obliging; but I charge 1 cent per lb. more for less than a dollar's worth.

In cold weather, when honey will not run readily, I put up honey in 1, 2, and 4 quart tin pails, and charge extra for the pails. Always, to every package sold, attach a neatly printed label, giving your name and address, and plain, simple directions for so caring for the honey that it may retain its good qualities until used. Dress neatly but plainly, like a farmer, not like a city man. Have every thing neat, clean, and attractive.

Now we are ready, how shall we find buyers? Fill a small new tin pail with honey, and label it. Call at every house—skip none. You will often make sales where you least expect it. When the door is opened, say, "I have some choice honey, please get a spoon and sample it." Right here is the main point. Get every one, if possible, to taste your honey. Most people have sweet teeth, and a taste of good honey puts them in good humor. Be

very sure that the children, if present, have a taste too. If you don't know already that parents' hearts are very easily reached through their children, you will soon learn it. If a servant or child goes to consult the housekeeper about buying honey, see that the honey-pail and a spoon go too. Twenty-four people out of twenty-five would say "no!" if asked if they wanted to buy extracted honey. If they taste first, many will buy. Many are prejudiced against extracted honey. Perhaps some time they have had a poor article of extracted or strained honey, or, may be, they think the honey is bogus. I have many times had such people taste my honey and say, in a surprised way, "Why, that is good. That is genuine honey. What is the price?"

One lady said to me last fall, "I never buy extracted honey. I buy comb, then I know what I am getting." After she had been induced to sample the honey she found it good, knew it was genuine, bought some, and asked me to call again.

Don't annoy people by urging them to buy when they don't want to, and be invariably polite and pleasant whether they buy or not. You can easily make friends who will be glad to see you come again. Follow the same route every year, and your sales will increase each trip. You can go over the same ground as often as once in six weeks to advantage. I have many customers who at first bought lightly, or not at all, who now buy 20 to 50 pounds of my honey every season. One near-by town of about 2000 population has used over 1500 lbs. of my honey this season up to Feb. 1, and all autumn honey too. I seldom have any other kind in my present location. But there is little buckwheat, and the honey is mostly from goldenrod, fireweed, and Spanish needle. One pleased customer will often find others for you. In this way I have this season sent three 5-gallon cans of honey to customers in Chicago, at 9 cts. per pound net. "Can't buy genuine honey in Chicago!" they say. A little ridiculous, isn't it?

Some one will ask if I have no competition in selling honey. Yes, but that doesn't matter much. There is plenty of room, and customers for all. Make a reputation for square dealing and selling a good article, and customers will wait for you. If some one undersells you, and gets some of your customers, never mind—there is a very large market almost entirely undeveloped.

Think of this matter, brother bee-keepers. Plan to raise a crop of good extracted honey next season, and then get all there is in it. Don't divide with transportation companies or middlemen. A crop of extracted honey is much surer than a crop of comb, and, in most localities, two or three times as great. Ask a fair price for your honey (all you can get is a fair price), and adhere to it. It is much easier to lower prices in a good year than to raise them in a poor one. If there is a large or small crop of grain or fruit, every one knows it. Not so with honey.

Covert, Mich., Feb. 8.

[I wish to place special emphasis on what

friend Burrell says regarding getting prospective customers to *taste* the honey, and especially the *children*; he says very truly that parents are easily reached through the children; and if you tell the good mamma, while the child is tasting, and teasing her to buy, that honey is far more wholesome as a sweet than ordinary syrups or sugars, you may be able to clinch a sale right then and there.

Friend Burrell's article will bear careful reading. It not only rehearses some things that we perhaps already know, but tells how to make a success of peddling, without losing one's dignity or self-respect.—ED.]

THE WAX-PRESS.

The Economy of its Use over the Solar Wax-Extractor.

BY J. J. RAPP.

I have been experimenting for a year or so with the various plans for getting the wax out of old combs, and have never been satisfied with the amount secured. Having several hundred old combs to render this year, I fitted up a press with which I have been very successful. The bee-keepers here who annually produce hundreds of pounds are surprised at the amount of wax they have been throwing away. One prominent apiarist estimates his loss at nearly two tons of wax since he has been in the business. Most of them have been in the habit of consigning every thing to the sun extractor, and being satisfied with the results. At first I had no idea of looking any further than to old combs for material to work in the press, taking it for granted that the work of a good sun extractor on cappings, in this land of sunshine, was about as complete as it was possible to make it.

But after trying it I find slumgum to be a rich source of wax, while moth-eaten combs, or any refuse that has been rendered by other methods, may be profitably worked. My first lot consisted of 284 combs, Langstroth frame, most of which had been in use ten years or longer, and were about as unpromising a lot as you are likely to find. Many of them were filled with old pollen, so that they weighed almost a pound apiece after cutting from the frame; or, to be exact, 20 weighed 18 pounds. They yielded 117 pounds of clean wax, or a pound of wax to $2\frac{1}{2}$ frames, or about $6\frac{1}{2}$ lbs. to a sixteen-frame hive, or $7\frac{1}{2}$ to a nineteen-frame. The weight of cheese corresponded with that of the wax, and about 20 lbs. was either soluble or carried off with the water.

I next tried a small quantity of capping slumgum (about 9 lbs.) that had lain in the sun extractor nine months, two of which were during the hottest weather we have here in California. It was as black and hard as coke, and showed about as little sign of containing wax. It yielded $2\frac{1}{4}$ lbs.

Third lot. Had an oil-case half full of sun-extractor refuse that had stood in the weather a full year, and was moldy, and even apparently rotten in the bottom, and full of moth-

cocoons in the middle. It gave 8 lbs. of fair wax, with a moldy smell, and the cheese weighed 18½ lbs.

Fourth lot. Melted the cappings from a pound of honey, in the sun extractor, and got 20½ lbs. of wax. Slumgum showed very little wax; but, by stirring, it might in a day or so have given another pound; worked the refuse in the press, and got 7½ lbs. more; or, the sun extractor took 72 per cent of the wax obtainable. I am satisfied that, with the best construction and management, the sun extractor will not save over 80 per cent of the wax in cappings, even here in California. All of this wax was as bright and clean as it is possible to get it in a small way, and brought 23 cts. per lb. here in Ventura.

Fifth lot. A neighbor had eight colonies that died in the winter or early spring, and left the hives with the combs in them remaining in the apiary until about Sept. 1, when I helped him dispose of them. We took the stuff out—worms, moth-cocoons, and webs, with the little comb remaining on the frames, and rendered it all together, and got 26½ lbs. of clean yellow wax; also four or five of a crumbly wax that I suppose to be myricin. It probably came from the excrement of the worms.

In order to test cappings refuse further, I got 313½ lbs. of a brother bee-keeper who had a large crop of honey this year. This lot yielded 96 lbs. of wax, 91 of cheese, and 126½ was either soluble or passed off with the water. Had I been able to get the amount of wax secured in the sun extractor, this would have been a conclusive test of its effectiveness.

I worked several other lots with similar results, but the above will cover the whole range of wax-producing material.

Ventura, Cal.


[In the past, the merits of the wax-press have been extolled by various bee-keepers; and I am aware, also, that excellent showings have been made—almost if not quite as good as those you have given; but there seems to be a difference of opinion as to whether the solar wax-extractor gets all the wax there is to be obtained out of the slumgum. Boardman stoutly insists that the large solar extractor that he uses does a clean job. If I remember correctly he sent us some of his slumgum in proof. We put it through our process, but the amount obtained was comparatively small. We discontinued the press several years ago. Instead, we save up our slumgum until some time when we can make a regular day of rendering it. Then we put it into our large steaming-vat, with four or five times the usual quantity of sulphuric acid, and let it cook and settle. Usually this strong acid solution will remove all the wax there is in the stuff. I know the residue will burn brightly when thrown into the fire; but Mr. Boardman says it is nothing more than propolis that he can not get and does not want.

I wish, friend Rapp, seeing that you are successful with the press, you would try a strong solution of sulphuric acid in the manner I have described; then take the residue

and compress it in your press; if you then secure a large quantity of wax, we shall have to give up, perhaps, that the press is ahead yet—at least, that *your* press is, in your hands.—ED.]

THE SIZE OF WORKER COMB.

A Correction from Thos. Wm. Cowan, Editor of the British Bee Journal.

Dear Mr. Root:—On page 144 you refer to the "number of cells of worker comb to the linear inch." Will you kindly look at my "The Honey-bee; its Natural History, Anatomy, and Physiology"? On page 180 you will see that I say, "The average size of a worker-cell between the parallel sides is $\frac{1}{8}$ of an inch, or 0.2 (a printer's error makes it 0.02; but it is two-tenths of an inch). Then I go on, "We say 'average,' because considerable variation exists in different parts of the same comb, as both Reaumur and Huber found." I then go on to summarize the large number of measurements I took; and if you will read the details you will see what a variation there is. You say, "It has been said over and over again in bee-books and bee-journals, that there are five cells of worker comb to the inch, so that we have come to believe it;" also that Cook is the only authority you have run across who says worker-cells are a little more than $\frac{1}{8}$ inch; but in my book you will find that, out of 36 measurements that were taken, I found the greatest aggregate diameters of any one series of ten cells to amount to 2.11 inches, which you see makes them considerably larger than $\frac{1}{8}$ inch. On the other hand, the least came to 1.86, which makes them smaller. You will also see that, to reduce the possibility of error, I also measured a large number of series of 60 cells, which, if the cells are exactly $\frac{1}{8}$ inch, would occupy a space of 12 inches. However, in almost every case the 12 inches was exceeded, although not always. Please also note that, on page 181, I say that cells worked by Carniolan bees are larger. Nearly the whole of the chapter is devoted to the measurements of combs and cells; and as I know these were most carefully taken, with most accurate instruments, I am certain of my facts. You refer to Cheshire; but has it occurred to you to test his figures? He tells us the length of the worker-cell is $\frac{15}{16}$, whereas it is only $\frac{13}{16}$, showing his cell to be nearly double the right length. His cell, drawn on paper, would look like this:  How would a bee like it? A similar error is made with drone-cells, which he says are $\frac{9}{16}$, but which are only $\frac{8}{16}$ inch long. He criticises Langstroth, who shows a cell with an acute angle, and says, "100° is the limit the bee can reach," and that no angles of less than 100° are found. I have been able to confirm Langstroth's statement by showing similar combs, and demonstrating that bees frequently work at a less angle, even, than 90°. I also show that, in the matter of angles, these differ considerably when carefully measured with a goniometer. I have for a long time considered that we should use the ex-

pression "average size" as being the more correct, as I have not believed in a worker-cell being exactly $\frac{1}{8}$ inch. I see Mr. Weed uses the term "average worker-cell," which is about correct.

THOS. WM. COWAN.

Loomis, Cal., Feb. 24.

[I am glad to get this, even though I do have to confess that I did not give your book the careful scrutiny that I should have done. I remember looking into it, and finding the sentence that "the average size of a worker-cell between the parallel sides is $\frac{1}{8}$ of an inch." Why I stopped and did not go further to take in *all* you said, I can not say. I shall have to acknowledge—indeed, I do so most cheerfully—that you have gone into this question far more thoroughly than any one else I know of. With regard to Cheshire, he who was so ready to point out the mistakes of others made a good many himself. If any writer lived in a glass house, he did. I am sorry to know that some of the glass seems to have been badly shattered. After all, he gave us much of value, even if he did make some glaring mistakes.

If I were not talking to Mr. Cowan's face, I believe I should say that, while his work is smaller, no one has pointed out an error in it, save the typographical one that he refers to above.—ED.]



SETTING BEES FROM THE CELLAR.

Question.—Will you please tell us in GLEANINGS something about setting bees from the cellar—when it should be done, and how to do it? That is, give us your opinion in the matter, and your way of working.

Answer.—As to time of setting out, there seems to be a difference of opinion; and the only way to fully settle which pleases *me* the best is to commence and set a few colonies out early, then set out a few at a time till pollen becomes plentiful from soft maple and elm, at which time *all* are agreed that the bees should be on their summer stands. Some think that, by setting the bees out early in March, when the first warm days come, they will raise young bees in sufficient numbers to take the place of the old bees that are lost and worn out of old age later on, when they commence to gather pollen, so that, in case of early setting-out, there is little or no spring-dwindling; while others are equally positive that bees should in no case be set from the cellar till steady warm weather is likely to be here, giving the time for settled warm weather as commencing with the blooming of the trees named above. These last argue that, with the warm weather, each old bee will nurse and bring on to the stage of action from two to five young bees, hence there will be no spring dwindling, but, instead, a hive full of

bees prepared for an early honey harvest, which could not be the case where bees are set out early, and using all their vital energies to nurse a little brood, which will not mature nearly fast enough to supply the waste of old bees which are lost in the cool weather of early spring, in their vain search for water, pollen, and early flowers. They do not argue that there is any scarcity of water at this time of year, but that the bees in going for it perish by the thousands in becoming chilled and benumbed by clouds passing over the sun, or by falling into the water. I have tried all ways, and must say that very much depends upon the way the season turns. Some years the bees early set out seem to do the best; other years those set out late have a decided advantage.

One year I did not set out the larger part of my bees till the elm and soft maple were past their height of bloom, and witnessed something I never saw before, which was, bees by the hundreds coming in loaded with bright red and yellow pollen, within half an hour after the colonies were placed on their summer stands. That it was possible for one old bee to be the means of placing on the stage of action five bees to take the place of itself, was abundantly proven that year; for, within 30 to 35 days from the time of setting out, many of these colonies were nearly or quite ready to swarm, and not a colony showed any signs of spring-dwindling. Within 21 days from the time of setting out, nearly every comb in the hive was filled with brood, and so perfectly solid that, when the young bees began to hatch, the hives were filled to overflowing in a very few days. However, to tell the matter just as it is, I am generally from ten days to three weeks in getting my bees out of the cellar, setting out from two to ten each fine day till all are out, and in this way I am quite sure of a full success with a part of them, no matter how the season turns. Long ago I came to the conclusion that it was not wise to have "all of the eggs in *one* basket."

Now as to how the setting-out is done. The first thing to do is to fit smoothly three or four thicknesses of old carpet or a horse-blanket over the wheelbarrow; and if the wheelbarrow can be one of the spring pattern, so much the better. The carpet or blanket is put on to take off all jar that there might be in wheeling the bees, for we do not wish to rouse them up any more than necessary. Having the wheelbarrow in readiness we next light the smoker, filling it so it will give a good volume of smoke as long as possible. With the two, and having our bee-veil on, we go to the entrance to the cellar, where we leave the wheelbarrow and smoker, and go in and get one of the colonies of bees, placing it in the wheelbarrow. As soon as this is done, puff a little smoke in at the entrance of the hive, so as to keep the bees from running out and stinging, which they are sure to do if no precaution is taken. Years ago I used to get stung terribly in removing my bees from the cellar, as bees which get into the air when being taken from the cellar are about the worst to sting of any during any time of the

year. I did not carry the bottom-boards into the cellar, and in carrying out I picked the hives up and walked right on till the stand was reached; and in thus carrying, many bees would take wing, get into my clothing, and "sing" and sting, as they did not know where to go, having, as yet, no location established. Where the bottom-boards are not carried into the cellar, I now have them at the entrance on the wheelbarrow, ready for the hive as soon as it is brought out. Then with smoke and something to place up to the hive so as to close the entrance, I have no trouble. Where the Dr. Miller bottom-board is used, the same having a deep space on its under side, which is now up and under the hive, I use a piece of plank or scantling, sawed off the right length so that it will slip right up in front so as to close this whole aperture. Having the scantling or plank of the right dimensions, it is next covered with three or four thicknesses of common cotton cloth, tacking the cloth fast to it. The whole is now thrown into water and left a few minutes till thoroughly soaked, when it is taken to the cellar and placed in front before the hive is touched. This keeps the bees from coming out, or making much effort to get out; for as soon as they come in contact with the wet cloth they immediately make an effort to get away from it, rather than try to push by it; for if there is any thing a bee detests it is a "wet rag." Wet cloths are of great assistance to me in many places in handling bees.

As soon as the smoke is puffed into the hive the cellar-door is shut (having an assistant to close it is still better), so that the outside air shall not raise the temperature and thus arouse the bees inside, when the hive is wheeled to where it is to stand during the summer, the entrance adjusted, and the shade-board or cover put on. No matter whether I use the wet cloth or not, I always puff in a little smoke at the entrance as soon as the colony is on the wheelbarrow, for this not only helps much in keeping the bees quiet, but it also causes them to be slower about coming out of the hive, so that swarming out and confusion are avoided. As hinted at above, the bees are not all taken from the cellar at once, but from five to ten are set out in the morning of any pleasant day, and then as many more at night, beginning about three or four o'clock, according to the warmth of the day and the earliness or lateness of the season. This is to avoid robbing and the mixing of the bees. At the out-apiary they have to be set out all in one day, unless I think it advisable to go two days. But in all cases the hives are scattered over the apiary as much as possible at first, then filling in between, so that no two colonies will be in full flight at the same time, which nearly or entirely prevents all mixing of bees, so that one colony is not strong in bees while another is weak, as often happens when no attention is paid to this matter, as is the case with very many who consider themselves good bee-keepers. The bee-keepers who pay no attention to such matters remind me of the queer man who has lived and toiled for a great many years about the outskirts of Boston, and

who by hard work has gathered together a good deal of property. During all of these years he has never paid a dollar for rent. He lives in a smoky old tent, which he moves from one place to another. He owns, however, a very beautiful house. He has built in the suburbs of that city an elegant six-story house, and many well-to-do people are his tenants, but he has never slept in his house himself. The old man hoards up the rent money which they pay him, and crawls back into his gipsy tent. In his fine house there are electric lights and gas-ranges, and every modern convenience and luxury; but he smokes himself over the smudge in his tent, and sleeps on a heap of straw. But before we condemn this man, as most of us would do on first thought, it might be well to ask ourselves whether we are giving the best or poorest of our natures to our beloved pursuit, bee-keeping. Are there not many of us who never fully enter into the high stories of the practical, intellectual, and scientific part of our pursuit — those who seldom meditate and muse upon the things that are to our best and highest advantage, but live for the most part in some smoky gipsy tent of thoughtlessness? Every one of us may live in a palace, with splendid windows for observation, and conservatories filled with the fragrance of flowers and the rich perfume of honey. Are we living there, or in the gipsy tent of don't care and thoughtlessness?



ARTIFICIALLY RIPENED HONEY; ITS QUALITY; A CLIP AT THE EDITOR.

I have often heard the "old saw" that men of sense sometimes change their minds, but fools never do. In GLEANINGS, Jan. 1, p. 19, I see an editorial on "What I call Well-ripened Honey," that indicates that you belong to the first-mentioned class. I am glad to see you getting over on my side of the fence. I have for years advocated and practiced ripening honey outside of the hive; but the editor, and several correspondents, condemned the practice, and accused its advocates of ruining the sale of honey by putting such "vile unripened stuff" on the market, etc. Some years ago I sent you a sample, taken before a cell had been sealed, and it would shake like water from the combs, and ripened in the open air. You and your experts pronounced it to be as fine a sample, both in color and flavor, as you ever saw, but cautioned your readers not to attempt to ripen honey by that process, as "none but an expert could be successful." Thank you for the compliment to my ability, but let me hint that you and "the other feller" can do it as well as I. You were so well pleased with the sample that you wrote immediately, offering to buy my crop; but it had already been sold at a large advance over prices quoted in market report.

The past season's crop, taken in the same watery condition, and ripened in the air, was sold early, in ton lots, at a cent a pound over the highest price I have yet heard of any other California producer getting. I believe that just as good quality can be had in this manner as by allowing it to ripen in the hive, and a greater quantity also, and it is certainly easier work. In this locality, if honey is left in the hive as long as advocated by some of your correspondents, it would be "vile stuff" indeed, owing to the tarweed and other dark and strong honey which follows closely on the white-honey yield. I practiced your process of ripening in the house, for several years in Indiana, without waiting for combs to be sealed, with good results. DELOS WOOD.
Santa Barbara, Cal.

[It was the senior editor who cautioned our readers against ripening their own honey. I don't know that I have ever taken a stand on the merits of artificially ripened and bee-ripened honey. But that honey "over at the house," in open vessels, is just fine. We can almost chew it now like so much gum — beats comb honey by considerable, in my estimation. But it's no disgrace to change one's mind. I have done it several times.—ED.]

DENSITY OF HONEY.

Mr. White's excellent article on well-ripened extracted honey came up at the meeting of the directors of the California Bee-keepers' Exchange, March 1. The density of the goods must exceed 12 lbs. was the unanimous sentiment as expressed. At that time every one was blue. We have had a good shower since. I now see no good reason why we may not have a honey crop in this part of the State if we have showers occasionally, if other things are favorable. Bro. White can get honey he can depend upon of the California Bee-keepers' Exchange. H. I. MORSE.
Hemet, Cal., March 12.

[There is no doubt but that the density of California honey is a little greater than that of eastern honey. The dry climate has a good deal to do with it, I suspect. To my notion, honey that is 12 lbs. to the gallon is several notches better than the 11-lb. article.—ED.]

PLAIN SECTIONS VS. SECTIONS OPEN ALL ROUND; WHICH WOULD BE CHEAPER?

I have been watching the writers in the bee-journals in regard to the fence-supers, and find most of them think the greatest advantage gained by the fence is to give the bees freer access to all parts of the super. Now, I believe it to be a good thing to have your super so arranged that the bees can go east, west, north, south, up, or down. This can be accomplished fully without the fence, and cheaper, with fewer pieces to handle. How? By using sections *bee-spaced all round*. These I have been using for two years with good results. The bees go to work readily, and I have fewer *bulged* sections, or sections only partly filled, than from any other sections that I have used.

As to separators, I threw them away long ago. My sections filled with separators looked lean and gaunt, while those filled without them looked fat and full, yet not so full but they would crate nicely. Now, then, if sections that are spaced all round will give the result desired (better access), why handle a great lot of lumber for nothing? It would seem this was progressing backward. Simplicity should be the order of the day, and not complication. I should like to hear from some other bee-keepers who have tried this kind of section. Perhaps, after all, we are not needing this kind of extra "fixin'."

Atwood, Ill., Mar. 7.

J. W. C. GRAY.

[I do not think there is any doubt at all that better-filled combs can be secured in what is known as the open-all-around sections, or what our English cousins have called four-bee-way sections. While it is true you may be able to dispense with separators, there will be hundreds of others who could not and will not.

You speak of the cost "of a great lot of lumber for nothing." You overlook the fact that in future, at least, plain sections can be sold much cheaper than the old-style bee-way section; and that the cost of the plain, including fences, would be less than the cost of sections open all round with separators.

But plain sections are especially adapted to be used without fences or separators. See editorials.

ASHES FOR DAMP MOLDY BEE-CELLARS; A GOOD SUGGESTION; SUB-EARTH VENTILATION.

Do ashes destroy mold and dampness? Last fall, when we put the bees into the cellar the bottom of it was damp. There was water in it in the spring, and it had not dried out yet; and when dead bees began to accumulate on the cellar bottom I discovered mold on them, and, in fact, there was considerable mold on the cellar bottom. My wife read in some paper that wood ashes are good to destroy mold, if sprinkled around in the cellar, or any place, for that matter, where mold is found. So, as our cellar was damp and moldy I sprinkled ashes as evenly all over the floor as I could; and, to my surprise, in a short time I could not discover any mold to speak of in any place in the cellar, and the bottom of the cellar is almost entirely dry; so I am giving the ashes (and my wife) credit for it.

I wrote Mr. Kretschmer once about our cellar causing the combs to mold, and asked if his was so. He said not, as there was a 30-ft. flue to his house, that started on the cellar floor, and that gave good ventilation; hence no moldy combs. We have no flue in our cellar, and I should like to know if putting a tile through the cellar wall, and letting it come out and connect with the outdoor air would give the proper ventilation. How far should it go before it opens to the outside? Had I better depend on ashes keeping the cellar dry and sweet?

One man wrote in GLEANINGS a short time ago about bees in a 10-frame hive with only 8

frames and dummies at the sides. What I want to know is, do the bees work in the outside set as well as if there were 10 frames in?

Bedford, Iowa. J. S. WILLARD.

[The kind of tiling you refer to, running under ground to a point inside of the cellar, near the floor, is called sub-earth ventilators. They are anywhere from six inches up to a foot in diameter, sometimes square but generally round, in which case, of course, they are of tile. These ventilators run under the ground from 50 to 100 feet, connecting with an upright ventilating-shaft reaching up a foot or so above the ground. If the cellar is on a hill, the ventilator runs out on the horizontal until it reaches the surface of the ground. It is then covered with wire cloth to keep out rats, mice, and cats.

At one time there was a good deal said in favor of these sub-earth ventilators, especially if used in connection with a pipe running close to the floor of the cellar, and connecting with the chimney of the room above. The last-named pipe is designed to carry away the foul air, while the sub earth ventilator brings in the fresh. The reason for running the pipe a distance *under ground* was to warm the air before it entered the cellar, and so far as it accomplished this object it was partially successful; but, strangely enough, reports seem to show, in many cases at least, that bees wintered no better in elaborately constructed cellars than in cellars without any ventilation whatever. Why this was so can be accounted for only on the ground that the bees got too much ventilation—that is, too much cold air. The owners of the cellars in question would fail to close the ventilators on very cold nights.

Notwithstanding what has been said all along against the sub earth ventilators, Dr. C. C. Miller and G. M. Doolittle seem to think they are a good thing. The former puts a small coal-stove in his cellar, not to raise the temperature, but to stir up the air and carry out the foul air when the bees become a little uneasy. He thinks a stove has much to do in quieting the bees.

Bees will not work so well on the two outside combs of an eight-frame brood-nest as if there were still two other combs outside of these, providing, of course, there were enough bees to cover all the combs.—ED.]

PRODUCING COMB HONEY WITH TWO LANGSTROTH BROOD CHAMBERS.

Mr. Editor:—I have read with much interest what you have said at different times regarding the use of two brood-chambers instead of one, even when working for comb honey. I have experimented some along that line, and expect to do more of it. I believe the use of two eight-frame brood-chambers will result in large surplus, less swarming and manipulation, but how to dispose of those extra brood-chambers during winter is what bothers me. I suppose the best way would be to get the bees all into one brood-chamber, with the best-filled combs of honey, and store the others to be placed back in the spring. I

should like to try a hive for comb honey composed of two ten-frame hive-bodies (dovetailed) in which the frames would be about seven inches deep, latest Hoffman style. Such a hive would possess all the good features of any of the interchangeable-brood-chamber hives, and the parts would be light enough for easy handling; but I should want to use over this hive only supers for comb honey of same width as used on eight-frame hives. That would necessitate something to stop up the opening on each side of the super. If such a super were used on such a hive I believe the outside row of sections would be better and more evenly filled. Bees do not like to fill sections that extend beyond the actual brood-nest on either side. Don't show this to C. A. Hatch or he will say I am getting over on to his side of the fence without due ceremony. May be I will try both sides a while. One thing I can say at this date—bees so far have wintered in splendid shape, and the abundance of snow this winter argues favorably for a honey crop for us Wisconsin bee-keepers.

HARRY LATHROP.

Browntown, Wis., March 10.

[I am satisfied that, in our locality at least, more honey, either comb or extracted, can be secured by working two Langstroth-depth brood-chambers than by trying to work one brood-chamber. Three different seasons have pounded that fact into my head. You ask what we do with the extra brood-chamber at the close of the season. We leave it on the hive till toward fall, if it has brood in both stories. Along in September, ten chances to one we will find the bees, and what brood there is, all in one brood chamber—probably in the top one. We remove the other one, and confine the bees to one hive-body, or the one they were in. If, after the honey-flow has closed, and one of the brood-chambers contains a set of extracting-combs with no brood in it, we take them away and give the bees a set of empties instead; but if they can be crowded into one brood-chamber, we take away brood-chamber, combs and all. There is no trouble, in my experience, resulting from the use of the extra brood-chamber.—ED.]

FACING COMB HONEY.

On p. 83 friend Snyder gives some plain statements on the facing of comb honey in cases among some of the dishonest bee-keepers. We can not doubt that his words are true in many instances. Praise the Lord! As for me, I could never misrepresent any thing knowingly. I always grade my comb honey, and then put each grade in its respective case, taking the sections as they come to hand in their regular order, placing them in the same manner in the case.

Since the kind editor rather courted the airing-out of his family of bee-keepers along the way as above mentioned, I felt prompted to give in my testimony, hoping that friend Snyder's experience will benefit each producer of comb honey.

M. A. SIMON.

Bloomdale, Ohio.



J. N., Ohio.—The earliest printed literature that we have on bees is Butler's *Feminine Monarchy*, printed in 1609. Perhaps the earliest reference we have to bee culture, and that very rude, is found in the *Georgics* of Virgil, who died 19 years before the birth of Christ; but the use of honey is contemporaneous with all human history. The earliest reference to the sectional honey-box was away back in 1868. This is in Kidder's book, "Secrets of Bee-keeping," page 174.

A. S., N. Y.—I am very strongly of the opinion that our Ideal sections will run about 13 or 14 oz.—certainly not over 15. If you glass your honey it would in any event be below the 16-oz. mark. A width of $1\frac{3}{8}$ might not run more than 10 oz., and that would possibly be too light a weight for you. Letters are coming in that indicate that the plain sections will hold slightly less honey than the same section just enough wider to take in bee-ways. If this is the fact, then our $1\frac{1}{2}$ -inch Ideal will run about right in weight for your purpose.

C. N. D., Tenn.—It is impossible to give you an estimate of just how many pounds of honey you ought to expect from each of your seven colonies. Your own skill and general knowledge of handling bees, and the season, will have every thing to do with it—more particularly the last named. Some years there is little or no honey to be had from the fields. But with so small an apiary as seven colonies there is no reason why you ought not to be able to get under fair conditions, and a fair season, 25 lbs. per colony. With good management and a good season you might secure 100 lbs. per hive.

F. M., Mich.—Where one expects to winter his bees out of doors right along, and it is a question whether he'd better use the single-wall Dovetailed or the double-walled chaff, we would recommend the latter by all means. The light two story chaff hive, illustrated on page 9 of our catalog, is but little heavier than the regular single-walled hive of the same dimensions. We use it very largely in our own apiaries, and prefer it to the single-walled hive because it is so little trouble to put the bees into condition for winter. You will notice, besides, the alighting-board has an enlarged entrance, which is quite an advantage; see Fig. 18.

F. W. D., N. Y.—We consider the starvation method described in our A B C book as the best and most reliable, as well as the most economical way of treating foul brood. We do not recommend complete extermination except in rare instances. The chaff hives will be fit for use again, after they have been scalded inside. You can, however, paint the inside with coal oil, set fire to it, let it burn till the inside of the hive is charred, then throw in a

small quantity of water, and clap the cover on. The steam thus generated and confined will arrest the fire at this point, and render the hives perfectly safe for use again.

S. J. F., Fla.—For various reasons we could not give you the names of dishonest commission houses, the principal reason being that we should thereby render ourselves liable. If you are a subscriber to *GLEANINGS* you will see that certain houses, whose names used to appear in our Honey Column, are conspicuous by their absence from that department. We do not say that they were dishonest, but we do not consider it to the interests of the bee-keeping public that their names should continue in that department.

F. C., Utah.—The refuse from your wax-extractor can be further refined by means of sulphuric acid. To every pailful of water, put in about a tablespoonful of commercial sulphuric acid. Pour about three pails of water into the barrel, throw in the refuse, turn on a jet of steam, heat the water to a boiling temperature, then let it stand for an hour, after which dip off the free wax from the top, being careful not to stir up the liquid too much. In using sulphuric acid it is necessary to use a wooden receptacle and steam. An old iron kettle might do, but a copper kettle must not be used. You will find full particulars in late editions of our A B C book, under the head of "Wax."

X. Y. Z., Conn.—We don't know just exactly why the sugar syrup should candy unless it is because you feed it too thick. It should be made in the proportion of one half sugar and one-half water, by weight or measure; but I am surprised that you would think of feeding it for filling out sections. If it were known that you sold such honey you would have a bees' nest of bee-keepers after you. Possibly you *sell* it as sugar-fed honey, but even then you would call down the wrath of the fraternity at large. I do not think you will find it will pay. It is hard enough to make it pay, even when you get the nectar of the flowers for nothing; but if you have to buy that nectar, and go to all the fuss and bother of making thin syrup and feeding it—well, I think it will overbalance the gain.

J. G., Can.—To tin a soldering-iron, take a common brick and scoop out of one of its faces a depression about the size and shape of a table-spoon. Fill this space with common pulverized resin. Next take the iron and file off its four faces bright and clean; heat it to about soldering-temperature; clean it with a moist rag, and then rub the iron in the pulverized resin in the brick; at the same time apply the bar of solder; work the iron back and forth, revolving it until the faces of the iron are covered thoroughly with the tin. In order to do a good soldering job on the honey-cans it is necessary to clean the tin thoroughly. The parts should be either scraped or filed. By working right you can usually solder such places with common resin. You can use acid, but it is better not to use it, for every thing of this kind is apt to corrode and make matters worse.



EIGHT extra pages.

M. H. MENDLESON, in writing of the situation in California, says:

There will be a big loss in bees in this State, and the loss by stockmen will be very great. This is claimed to be the driest year for over 34 years. Many a good man will lose all he has made by many years' hard labor.

M. H. MENDLESON.

Ventura, Cal., March 11.

It looks now as if there surely would be no California honey of any consequence, of the 1898 production; and a good deal of the '97 honey that was held over to sell this season will have to be used to feed back to colonies to keep them from starving.

MISQUOTING.

WHY will some of my good friends so persistently misquote what I have said about the fence and plain section? One friend implies that I have said there would be absolutely no peek-holes or corner-holes in the new sections. I should like to have that person point out the sentence or sentences wherein I have used such language. Again, another corrects me by telling me that the plain section and fence are not new, but older than the hills. Those of our readers who have read carefully what I have written know that I have said repeatedly that they are almost as old as any thing we use in bee-dom. Why will other folks set up a man of straw, call it *my* man, and then proceed to knock it over—with clubs I myself have furnished?

FOUL BROOD FROM ROTTEN BROOD.

WM. McEVoy, Foul-brood Inspector for Ontario, Canada, has maintained, and still insists, that "foul brood is a disease that is caused by the rotting of uncared-for brood." I have held that dead brood, either by chilling, overheating, or starvation, would not of itself cause the disease; that there would have to be, in the first place, the germs, and from these germs would arise foul brood; in other words, that corn would not grow where no corn was planted. While I still think so, I am willing to admit that there is much of truth in Mr. McEvoy's statements; namely, that dead or rotten brood may be a favorable medium for the germs of *Bacillus alvei* to work in, in the same way that good rich ground will grow celery better than poor ground. If there is any truth in the statement that foul brood proceeds from dead brood or rotten brood, it is because there are already germs in the hive; and these germs, finding lodgment in the dead brood, give rise to the disease, when, if the brood were all healthy, they would not be able to make a start.

NO-BEE-WAY SECTIONS ADAPTABLE TO THE NON-USE OF SEPARATORS OR FENCES.

SOME bee-keepers somehow manage to get along without separators, and, while admitting

that the great majority can not do so, it may not be amiss to suggest that plain sections may be better adapted to be used without dividers than the old bee-way sort. Why?

When A. I. R. was visiting W. K. Morrison, of Devonshire, Bermuda, the latter talked a good deal about using sections in supers without separators; and now that plain sections had come to the fore, they were just the thing. I do not know personally just how he would dispense with the separators, but I suspect by putting them in supers (say T supers, for instance), sections spaced about $\frac{3}{4}$ inch apart, without any separators or fences between them. According to Mr. Morrison's idea, a row of plain sections right along together, having even edges, and without any separators between them, would give almost the same condition that exists in the brood-chamber. There would not only be no separators between the sections, but there would be *continuous passageways from one section to another*.

I have been talking with Mr. Chalon Fowls, of Oberlin, O., who is visiting us to-day; and while he has never tried it he seems greatly interested in the plan. He for years produced his comb honey without separators, in old-style sections. He liked the new plain sections, but would prefer to use them without separators or fences, and I explained to him how it could be done. One of the methods suggested was to use the old-style double-tier wide frames that many have in their garrets or barn-lofts. Into these put the plain sections, and space them exactly in the center; hang them carefully in the super, without any separators or fences between them, and, presto! we have a lot of thick brood-frames, as it were, divided off into four compartments, which the bees will regard, possibly, very much as so many extracting-combs, having cross-sticks, we will say, running perpendicularly and horizontally through the frames.

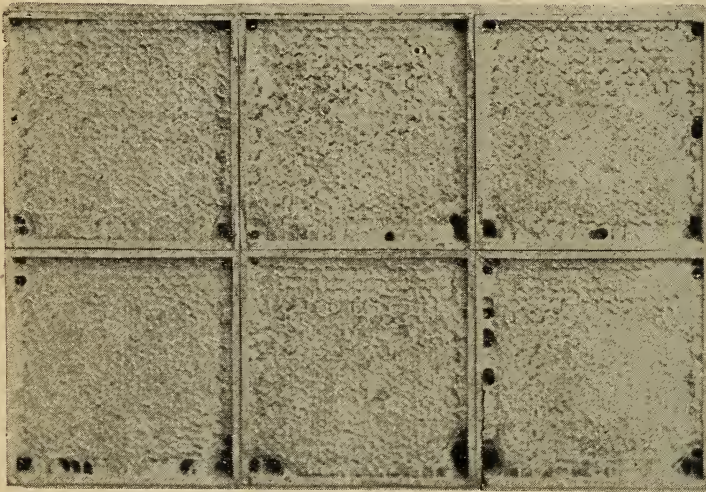
Now, please do not get the impression that the new fence is the all-important thing or fad of the day. The fence is only secondary in importance. It is the plain section that seems about to revolutionize the present methods of comb-honey production. For those who must use separators, then of course the fence, or something equivalent, will have to be used.

Personally, I don't believe it would be profitable to dispense with separators or fences in most localities; and this reminds me that locality has every thing to do with the matter. If the honey-flow comes in spurts, with a let-up and a rush, then dividers of some sort, to my notion, would have to be used. If, on the other hand, it is slow and continuous, without any spurts, then, with the right management, they may, perhaps, be dispensed with.

ASPINWALL'S SECOND-QUALITY HONEY IN PLAIN SECTIONS.

SHORTLY before that characteristic engraving appeared in the *Bee-keepers' Review*, showing honey in plain sections and honey in bee-way sections, and which we reproduced in our columns on page 128, I wrote to Mr. Aspinwall, asking him to send us a photo showing a

representative lot of his honey. He replied that he had already sent his best sections to Mr. Hutchinson, and that he presumed a view of them would be given in the *Review*. However, he would have a photo taken of some of his next grade. This he did and sent it on, and the engraving herewith shows what Mr. Aspinwall calls second-quality honey in plain sections. I suppose he called it "second quality" because it had peek-holes in various places. If that honey had been reproduced in old-style bee-way sections we should have called it "extra quality." At all events, I



ASPINWALL'S SECOND-QUALITY HONEY IN PLAIN SECTIONS.

think it would fill the bill for Fancy as per specifications adopted at the Washington convention.

No wonder Mr. Aspinwall has sold off all his first-quality, and had very little left of his second. I am just Yankee enough to want to know how much this comb honey netted him for first and second quality. During the past year, average comb honey in old sections did not run, I think, over 10 cents on the average to the bee-keeper, and perhaps not that after freight and other expenses were taken out. Perhaps Mr. Aspinwall will tell us something further about it in the *Review*.

W. F. MARKS, OF NEW YORK STATE; THE SPRAYING-BILL; *APIS DORSATA*.

YESTERDAY, March 24, we had the pleasure of a visit from Mr. W. F. Marks, of Chapinville, N. Y., a bee-keeper whom I called on while making my last bicycle-trip through that State. My visit to his place is described on page 57 for last year. Ever since I met Mr. Marks I have been impressed with the fact that he is one of the leading and influential bee-keepers in his State; in fact, he is a born fighter. It was largely through his engineering that needed legislation was secured against spraying while fruit-trees were in

bloom. Everybody opposed him except intelligent bee-keepers; but, with that indomitable energy which is characteristic of the man, he whipped bee-keepers' associations, farmers' clubs, college professors, experiment stations, Senators, and Representatives into line. Mr. Marks has recently been made president of an association that is about to combine all the bee-keepers' societies of the State into one effective working organization, and I expect to see things hum in that State soon.

I have suggested that he look after needed foul-brood legislation in his State. If he takes hold of it he is bound to get what he wants.

He is an enthusiastic bee-keeper; and, besides pushing measures calculated to benefit the whole fraternity of the State, he has done some experimenting on his own account. He has been testing sandpaper, sand-wheels, etc., for cleaning propolis from sections; and although he has tried all grades of paper, from fine to coarse, he has come to the conclusion, after repeated tests, that sandpaper will fill up or gum up with propolis too soon to make it a

success. He does not claim that machine section-cleaners can not be made to work, but only says that *he* so far has not been able to obtain satisfactory results.

In talking with friend M. regarding T supers and section-holders he expressed himself decidedly in favor of the latter; could not see how Dr. Miller or any one else could prefer the T super, and he has given both a thorough trial if I am correct.

Our readers will also remember Mr. Marks as one of the ardent champions of *Apis dorsata*; and while I at first opposed any movement on the part of the government, looking toward the importation of these bees into this country, believing it was an effort in the wrong direction, yet friend Marks whipped me into line—that is, to his own way of thinking. And he whipped, later on, the whole, or nearly the whole, Buffalo convention into the same channel. The result was, he secured a resolution which was at least not unfavorable to the big bees.

He had with him, here at Medina, some of the *dorsata* in a small vial of alcohol. If you can imagine nice Italians soaked in alcohol, one-third or one-half larger than usual, you will have a fair idea how these bees look. Of course, there are minor structural differences; but the casual observer would almost call them

mammoth Italians. Mr. Marks is more sanguine than I am of the value of these bees in the way of fertilizing certain fruit flora of the country that is now inaccessible to the ordinary honey-bee by reason of the depth of the flowerets or pollen-cavities which they can not reach.

NO-WALL FOUNDATION, AND FOUNDATION WITH WALL RUNNING 18 FEET TO THE POUND.

QUITE a little has been said of late in several of the bee-journals in regard to the no-wall foundation. Our readers will remember that, at the Michigan convention a year ago, the members contributed toward the purchase of a machine that would make that article. We made the mill, and subsequently no-wall foundation was made from it running 15 or 16 feet to the pound. This has been tested by several of the Michigan bee-keepers, prominently among whom was Mr. T. F. Bingham, of smoker fame. They found bees would accept it, and in their judgment there was less of fish-bone than with the ordinary foundation having walls. But all experienced one difficulty with it; namely, that it curled up or warped somewhat during the process of drawing out by the bees. In a recent article in the *American Bee Journal*, Mr. Dadant attributes this curling to the manner of *milling* the wax, saying that sheets should leave one roll instead of parting from both rolls at one and the same time.

Somehow, our own experiments lead me to believe that no-wall foundation can not be made a success as compared with the light-weight wax with wall. We are satisfied that, in the near future, we shall be able to turn out foundation with walls running *18 feet to the pound*, and beating all our previous records. Indeed, we have already milled a considerable quantity of it running at that weight. If we were to eliminate the wall, the wax might run 20 or 22 feet to the pound; but in my opinion the wall is necessary to prevent sagging and curling of wax so light as this, no matter how the sheets are milled, or, rather, how they come off the rolls. The machine on which this very light weight foundation is made is constructed on an entirely different principle. But more anon.

On a similar machine embodying the same principle of construction, we hope to make a brood foundation fully as strong as the ordinary brood running 9 to 10 feet to the pound. But the bases of this new foundation are as thin as the bees make them; namely, $\frac{20}{1000}$ of an inch, instead of $\frac{20}{1000}$ of an inch as in the old brood foundation. The no-wall foundation that came off from the mill that we made, running 15 to 16 feet to the pound, had bases about $\frac{100}{1000}$ of an inch thick. It will be seen that this is three times as thick as that which has walls running 18 feet to the pound, off from our latest mill. But this is not all. Our experiments show that the bees will not thin the bases, but they will reduce the walls. If they will thin the walls, however thick, to natural thickness, don't you see that the resulting comb will be as light as natural

built? But if they will not thin the base of the no-wall foundation $\frac{100}{1000}$ thick then I don't see but that the result will be fishbone in the comb.

N. B.—We are not ready to sell 18-ft. foundation in quantities, nor mills for making the same.

WHAT'S the matter with bee-keepers this year that they are going in so heavily for supplies? Beyond the fact that bees have wintered well, there is no indication that the season will prove to be any thing remarkable.

REPRESENTATIVES OF THE U. S. B. K. U. AT THE PURE-FOOD CONGRESS.

EDITOR ABBOTT, of the *Busy Bee*, who was one of the delegates, together with Eugene Secor, appointed by the Executive Committee of the U. S. B. K. U. to attend the pure-food Congress at Washington, March 2, has this to say concerning the result of their visit:

There were nearly 300 people in attendance, and almost every leading productive industry of the land was represented. The writer and General Manager Secor went as delegates, at the request of the President and Board of Directors, to represent the United States Bee-keepers' Union. As there was considerable expense attached to such a long trip I had some doubt at first about the propriety of sending delegates; but the moment I reached Washington, and saw the class of men there present, and the industries which were represented, all doubt was dispelled. One of the leading ideas of our Union is to "prevent the adulteration of honey," and more was done at Washington in co-operation with other industries in two days than we could do in years working alone. What we want and need is a national pure-food law covering every article of human consumption for either food or medicine, and we seem now to be in a fair way to get it; and the members of the United States Bee-keepers' Union can feel that they have had a hand in the making of it. Your delegates received the fullest recognition on the floor of the congress, and bee-keeping at once took its place along by the side of other trades and industries, and was recognized as a part of the great movement for pure food and common honesty, which is sweeping over the country from Maine to California. Mr. Secor was placed on the committee on credentials, and the writer was made a member of the committee on permanent organization, and was subsequently elected chairman. Later Mr. Secor was appointed a member of the committee on resolutions, and myself a member of the legislative committee of 25 to consider the "Brosius bill," and report to the congress. We were also made vice-presidents for our respective States. I do not mention these things to bring myself and Mr. Secor into prominence, but to let the bee-keepers know that our union received full recognition by the other industries.

The congress elected Mr. Blackburn, the present food commissioner of Ohio, and a gentleman of sterling worth and wide experience in pure-food legislation, its permanent president; and I take pride in saying that, as a member of the committee on permanent organization, I had a hand in presenting his name to the congress. He proved to be the right man in the right place.

I have not the space to give a full account of the meeting, but will say that the unanimity of sentiment and feeling manifested by the representatives of the various industries of the country on the subject of pure food points to the fact that a powerful influence will be brought to bear on the Congress of the United States, when the bill comes before it, for its immediate passage. The reader can help to swell this influence by writing to his Congressman and the members of the Senate from his State, saying that their constituents ask that, when the bill recommended by the pure-food congress comes up for passage, they give it their hearty support.

I do not believe that any member of the Union will begrudge the money expended, in view of the fact that we have secured the recognition we have. Abbott and Secor are active workers—the former is bound to make

himself *felt* on the floor, and evidently did at the Congress; and the latter is a wise and efficient committee man.

I somewhat question, however, the wisdom of hitching on to a pure-food law the matter of patent medicines. If there is any combination of capital that will fight this law it will be the gang of quack dosers; and I question the wisdom of imperiling needed legislation along the line of pure food, by hitching on to it a drag that may prevent its passage.

The suggestion made by Bro. Abbott, in his last paragraph, is most excellent, and the only way to make it effective is for our subscribers, at once, before they forget it, to write to their members of Congress. We may be sure that the glucose-mixers and the patent-medicine men will not only be putting up capital, but will be sending in scores of protests.

It is a great gratification to me to know that our Ohio Mr. Blackburn is permanent president. We Buckeyes know what good work he has done in the interests of pure food. The quacks and the food adulterators have been leaving no stone unturned to put him out of office; and the worst part of it is, they have secured the influence of some reputable daily papers (which see filthy lucre—from their "ads") to fight him. But he knows he is right, and is standing by his duties like the fearless soldier that he is. Certainly we beekeepers will hold up his hands in this great fight. Write to Food Commissioner Blackburn, and tell him to give the adulterators more "hot shot."



I confess it is a little comforting to know that the Dairy and Food Commissioner of the State of Ohio has got down to the business of exposing injurious and fraudulent patent medicines. A bulletin has just been published, entitled, "Address Delivered before the Ohio Editorial Association." I wish every father and mother and every one else in the land could read it; and I presume it can be had by addressing Jos. E. Blackburn, Dairy and Food Commissioner, Columbus, O. Now, I can not copy as much as I should like to do from this bulletin. But just let me give you a paragraph:

Several months ago one of my chemists mentioned the name of a well known catarrh cure, and stated that in a certain Massachusetts town it began to be generally used among the employees in a large cotton-mill. The label stated that it contained cocaine. In a short time the persons using the preparation learned that it was the cocaine that gave the temporary relief sought for, and they began buying it directly at the drugstores. In a few months, nearly the entire working population of the town was completely demoralized from its use.

From the above you get a glimpse of the reason why medicine-venders can offer free samples of their stuff and pay the postage. One free sample bottle may get a whole town to patronizing them. How much better is it

than offering schoolboys intoxicating liquors free of charge in the shape of beer or summer drinks? Let me give one more case that illustrates how these drugs will capture a person, body and soul, when he once gets started:

One incident occurs to me that will illustrate the persistency with which these fiends will pursue the object of their enslavement. A woman in Wheeling, West Virginia, happily married, and the mother of two children, became addicted to the use of chloral. Her husband notified the druggists not to supply her. She came to Bellaire, and secured a prescription for it. I filled it myself. She returned in a few hours to have it refilled, telling me that she had accidentally spilled it. The next morning she came again, and said that she had dropped the bottle and broken it. I again filled it; but my suspicions were aroused, and I telephoned the physician who had written the prescription. He said he knew nothing about the case except that he had prescribed it for her at her request, to allay some nervous pain. The next time she called I took the bottle, destroyed the label, refused to refill it, and would not allow her to have a copy of the prescription. She became frantic; she offered the entire contents of her purse for one dose, but I refused. She then begged, appealed, and finally wept, and, becoming desperate, attempted to disrobe in the store. The interview ended by my forcibly putting her out of the store and ordering her never to come back. I afterward heard that she abandoned her family, and entered upon a life of dissolution and dissipation.

Now, then, dear readers, I do not know but I shall have to take some of my own medicine. Some of you may remember that, when I was in Atlanta, Ga., I bought a bottle of Perry Davis' pain-killer, and actually gave it quite a write-up because it gave me relief, and cost only 20 cents a bottle. See the following:

"The sale of soothing syrups, and all medicines designed for the use of children, which contain opium and its preparations, should be prohibited." I copy a part of the list published by the Board of Health as containing opium:

- "Piso's Cure for Consumption."
- "Jaynes' Expectorant."
- "Perry Davis' Pain Killer."
- "Mrs. Winslow's Soothing Syrup."
- "Coe's Cough Balsam."

I should be very glad indeed to take back or contradict what I said in favor of the pain-killer; but thousands of that journal were sent off broadcast, and a great part of those who read my recommendation, and perhaps bought the pain-killer, will never see it at all. You see how it behooves us to be *careful* about recommending medicines to our friends. Of course, the manufacturers of these preparations, and a good many of the druggists, are waging war hot and heavy on the Ohio Food Commissioner. The pamphlet I allude to was published mainly in order that he might give his reasons for the course he had taken. The Ayer Co., I believe, have been waging war in the shape of suits at law, more than almost any one else. Now, then, shall the patent-medicine men, the opium and cocaine venders, with their great wealth, choke out or "snow under" this effort that our State of Ohio is making to save our people from the terrible effects of these deadly drugs? For my part I begin to think I would rather *be* sick than be cured with something that "comes out of a bottle." Hold on a little. Let us put it this way: If I am going to be cured by something that comes out of a bottle, I want it administered by somebody who is a personal friend of mine, and one who would not give me poisonous drugs when I told him how I felt about it; and that person shall be *our family physician*.



A bruised reed shall he not break, and smoking flax shall he not quench.—ISA. 42:3.

When I was in Bermuda I was a good deal surprised to read in one of the local papers of the island a protest from one of the soldiers. The whole island of Bermuda, or at least a good part of it, is covered with military defenses, forts, etc., and I greatly enjoyed witnessing the military parades and getting acquainted with some of the soldiers. Well, this protest from a soldier was to the effect that some of the boys on the island were getting to be very rough. He said he and his companions had been "sassed" and stoned; in fact, one of the soldiers had his face badly cut open with a piece of rock; and I tell you, a chunk of coral rock, even if it is not very heavy, is a bad thing to strike one in the face. I remarked to friend Morrison, after reading the paragraph, "Why, friend M., how dare anybody molest soldiers? I supposed they were like policemen or officers of the law; that they had authority to arrest and imprison boys or anybody else for such an offense."

"Oh! you are quite wrong, friend Root. One of the very first elements in a soldier's training is that he must stand his ground, and put up with almost any indignity, without showing either temper or retaliation in any shape. The *Queen's* soldiers, in fact, are expected to stand still and be shot, rather than to commence any sort of warfare without orders."

"Then their beautifully kept guns, bayonets, and other arms, are simply for show, and not to be used, even in self-defense?"

"They are not to be used in self-defense unless they have *orders* to use them."

Come to think of it, I believe this is military training in almost any part of the world—that is, as friend Morrison expressed it. Troops are frequently called out to keep the peace in our own State of Ohio and other States; but if they are true soldiers they will resort to almost any thing else under the sun before they will use their implements of war with which they are well provided. In fact, this has been so universally the case that a great many times the lawless mob have taunted them with it, telling them they dare not fire; they were only "dudes set up to make a show." When, however, forbearance ceases to be a virtue, and the order is given to fire on the mob, who are bent on the destruction of property, or something of that sort, even in such a case the soldiers have been loudly condemned because they did use their weapons. In matters of law the government of the United States has been so slow a great many have had the idea the government never would do any thing, and did not *intend* to do any thing. Sometimes I have been tempted to complain because the strong arm of the law was so *very* slow to move. But of late years I have begun to think it is well and wise that

these acts are done with such extreme deliberation. Don't be in a hurry to quarrel, either in public life or private. If you turn to the chapter that contains our text you will find at the top of it—at least it is so in my Bible—"The office of Christ graced with meekness and constancy." In the first verse the prophet tells us that God has put his spirit upon Christ the Son. In the second verse we are told "He shall not cry nor lift up nor cause his voice to be heard in the street." Whatever he does shall be done so quietly that no disturbance will be made. Many people will not know any thing is being done at all. Then we come to the text. His mission shall be performed so gently that even "a bruised reed" shall not be broken in two; and the smoking flax, that is so easy to put out by just stepping on it, shall not be quenched. And yet we are told in the same verse, "He shall bring forth judgment unto victory and truth." In the fourth verse we read: "He shall not fail nor be discouraged till he hath set judgment in the earth; and the isles shall wait for his law." Even that little gem of an island away off there in the sea, beautiful Bermuda that I think of so often, shall be converted to Christ. And I can not help thinking that it is comparatively near the kingdom already. There may be a few unruly boys there such as the soldiers met; but by far the greater part of them respect the Sabbath and go to church. Some little girls in our neighborhood, from seven to twelve years of age, walked a mile and a half and back to meeting in the morning, and the same distance again to the evening service, even when there was not any moon.

But we are to talk about getting along in the world *without* warfare. I shall confine my remarks mostly to a warfare of words. You know my doctrine is, that a husband and wife should never part; and when the two become father and mother, *then* most assuredly should they two hang together "till death" and nothing else separates them. Well, I have been thinking for a few days that not only should husband and wife hang together, but as a rule I would have employee and employer keep right along—at least, so long as one wants a helper and the other wants a place to work. There are now something over 200 at work at the Home of the Honey-bees. Some of them are good and faithful, and some indifferent; but God forbid that I should say that even *one* of them is *willfully* bad. Sometimes there is talk about dismissing one for bad conduct. When I hear of it I almost always beg to have the job put into my hands. But Ernest says (at least lately), with one of his comical looks, that whenever they are turned over to "father" he always keeps them awhile longer, and they never get dismissed at all. Well, I am glad that it is so. There are some here who have tried me most sorely in years past; but as we kind o' kept together I learned to know them better, and they learned to know me better—yes, and I found some redeeming traits—sometimes *valuable* traits—in those I had trouble in getting along with. Some of those I used to dislike I now *love* to see, and I like

to be along with them. Dear friend, as *you* grow older do you get along with people *better* than you used to do? Is the spirit "of Christ graced with meekness" finding a permanent lodging-place in your make-up? If so, rejoice and be glad.

Sometimes people are contrary, and sometimes *you* are contrary. I take the liberty of saying this, for I am contrary myself if I do not look out. I have sometimes prayed most earnestly, "O Lord, my great helper and my best friend! Give me grace, and give me of thy Holy Spirit that I may be very careful about the *contrary* spirit that sometimes creeps in upon *me* unawares. I need help and deliverance in this, O Lord; for how can I expect others to put away the contrary spirit while it has a lodging-place in my own heart?"*

Sometimes very capable and in other respects lovable people get contrary because they can not have their own way. None of us can have our own way in this world. You may think that, because I am the senior member of this company, I certainly can have my own way in almost every thing. But it is not true. I am not very much troubled about having my own way with the other members of The A. I. Root Co.; but I am more troubled because some of the helpers absolutely will *not* do as I want them to. Do they know what I want? Yes, I am sure they do; and they put on an appearance of doing just as I say, but they beat me and get out ahead. I have almost given up sometimes, for they have apparently whipped me out. Now, the very ones I have in mind while I am saying this would be astonished if I should say, "I mean *you*." I do not suppose they are *really* aware that they are planning and plotting *not* to do things as I want them done. I do not believe they realize it. The contrary spirit has got into their hearts, and they actually do not know how they are hurting my feelings and really spoiling their own money value. Most of Satan's work is done by persuading his victim that he is doing the right thing. Jesus once breathed a strange prayer: "Father, forgive them; they know not what they do." Of late I have thought this same thing of some of these friends of mine. I ought to forgive them—at least to a certain extent, just as Jesus forgave and prayed for his enemies, because they certainly do *not* realize how wickedly they are doing.

But shall we let people go on being contrary? Shall the soldiers in Bermuda let the boys stone them? No, no! The one who wrote the article in the paper told the boys they would be dealt with according to law if they persisted in their rudeness. Well, I expect these friends of mine to get over being contrary. In fact, if they do not they will suffer. How? Why, pretty soon, when our board meets, the matter will come up, and it

will be remarked that such a one is not worth what he is getting, because he is not working for the best interests of the business. If he can be told this in a quiet way—one that will not provoke him to be *more* contrary or to throw up his job when he needs the place and we need the man—then we are all right; and my principal thought in this talk to-day was how best to handle such a case. Suppose you have a hired man, and he is tiptop every way except that he is up so much nights, and out so late, that he can not properly attend to his work daytimes. Turn him off? No, no! not just yet, anyway. Choose a proper time and place, and broach the subject gently. Now remember our text. Do not say *all* you feel like saying—not the first time, anyway. Bring up the matter very gently. State it mildly. Tell about a *quarter* of the state of affairs as they appear to you. You can tell another quarter the next time. When you have told about a half of the trouble he has made by his bad habits or habit, whatever it may be, and it does not do any good, the third time tell him the third quarter. If three-fourths of the whole truth does not answer, perhaps you had better never tell the other quarter at all. If you must part, part good friends.

I know of a man who owed a neighbor almost a hundred dollars. It was not outlawed, because he kept on saying he would pay it. Well, he finally did pay it, and got a receipt in full, but he did not pay the whole amount. He paid only about a quarter or a third. His good neighbor pleasantly agreed to throw off the rest in order to have it settled up. Well, I supposed they were going to be good friends after that; but the man who got the receipt in full by paying only a small part of the debt was tempted by Satan—I guess it was Satan—in some way or other to say some hard and unkind words to the neighbor who had been so patient with him so long. I presume he will excuse himself for saying those unkind words by saying, "It is the truth." Oh dear! what a poor excuse for saying unkind things, because—*they are true!* Why, my good friend, because they are true is one of the best reasons in the world why you *should not* wound the feelings of your neighbor by saying things.

Now, my dear friend, if you are having difficulty in getting along with your hired man or your helper in the household, or your washwoman, or with anybody else, do not, I beg of you, be in haste to dissolve the relations that may have been standing for many years. These friends who have been long with you know what you want ever so much better than anybody else. You know *them* in the same way. By years of close relationship you have got fitted to each other's ways. Do not be in haste to quit, and do not be in haste to turn off your old "standbys." *Pray* for each other. If one of you two is not a praying man or woman, then let the other pray the more. Oh how much better one feels when he has accomplished what he wished, without a quarrel! I wonder if there is any need of my adding that sometimes it seems as if a quarrel could not be avoided. If this is indeed true,

* Since the above was dictated, it has occurred to me that David once breathed a similar prayer—"Create in me a clean heart, O God, and renew a right spirit within me. . . . Then will I teach transgressors thy ways, and sinners shall be converted unto thee." How beautifully, and how sharply and clearly the meaning of the above comes out, after having yourself passed through an experience of this kind!

let it be a *little* quarrel. In fact, every few days something will happen that makes it very desirable to fix things up again. In view of this, please remember, "Least said, soonest mended." It is springtime now, and most of us want help for the spring work, and lots of people want places to work. Is it not lucky that the two wants can be filled so nicely? When you hire a man you kill two birds with one stone—that is, if you do it with love toward him in your heart; and when you get this man to do just what you want him to do, without even a little quarrel, you are killing a great many birds with one stone. It is very bad to change helpers. Ask the gardener how he likes to keep a man long enough to help him plant all his stuff, and then have trouble with him, and let him go before any thing has come up. When I was a small boy I studied shorthand. One day I puzzled my brain several long hours to read a communication in shorthand. When I got it out I was so happy I think I shall always remember it. The words were these:

Deal gently with the erring:
You may not know the power
With which the dark temptation came
In some unguarded hour.



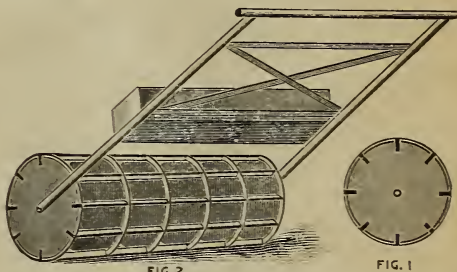
GROWING ONIONS ON THE ISLAND OF BER-MUDA.

As I have said before, all the onions used, so far as I can learn, are raised by setting the plants when they are of the proper size, say the size of a slate-pencil or lead-pencil. The plants are raised very much as we raise them here. The seed is sown quite thickly in drills, say from 12 to 20 seeds to the inch of drill, the seeds being pretty well scattered, so the plants do not crowd each other too closely. Of course, the ground for the seed-bed needs to be very rich. As there are never any frosts in Bermuda, there is never any occasion for using sash. I think, however, that a covering of cotton cloth would be, many times, a great benefit in keeping off the cold winds. About the only damage their crops receive from the weather is from high winds, especially when the winds are cold. I believe they sometimes have hail—that is, such as we have during a thunderstorm.

The ground is prepared for transplanting the onions just the same as for potatoes; but the surface is raked over so as to have it fine and smooth. I found Messrs. Brown and Adams, at Devonshire, using a home-made marker to mark out the ground for onions. This marker seems to be so much of a labor-saver in getting just exactly so many onions on the ground, and no more, that we give a cut of it.

The apparatus I saw was a home-made one. There are six wooden wheels. These wheels are very much like the bottom of a wooden

pail. In fact, if you will get six pail-bottoms (each made of a single piece of wood), they will be just about what you want. These wooden wheels should be sharp on their edges, so that, as they go into the dirt, they make a V-shaped groove. There is a hole bored exactly in the center of each, through which to put some kind of shaft, say a broom-handle or hoe-handle. After the wheels are bored, put them up tight together, and fasten them in some way, say with a large-sized bolt, so you can screw them up tight; then put the wheels in a vise, and with a saw, mallet, and chisel, cut down through the whole six so that each one will be like Fig. 1. The slots cut



MACHINE FOR MARKING THE GROUND FOR TRANSPLANTING.

down in each wheel are for slipping in a piece of wood about like a common plasterer's lath, each one of these strips of wood being sharpened on each outside edge, so as to make a V-shaped groove in the ground. Now put your wheels on the shaft, spacing them so as to stand about 8 inches apart. Now crowd your sharpened strips into the slot each one sharp edge outward. The slots in the wheels should be just right to bring the strips 4 inches apart. This will make your onions stand 4 inches apart in the rows, and rows 8 inches apart—pretty close planting, you may say, but you want the ground rich enough so the onions will almost crowd each other out of the ground.

To use the machine, stretch a line on one side of your ground, say about 4 feet from the outside of your piece of ground. Now run your machine, wheelbarrow fashion, so that the outside wheel just clears the line, the operator at the same time walking on the opposite side of the garden-line. If your ground is not soft enough so your machine will sink to the right depth by its own weight, load it down with stones placed in the box just behind the wheels. The wheels with their strips should sink into the ground so as to make lines lengthwise and crosswise. The planters are to put an onion wherever the lines cross each other. These marks can be much more readily seen than wooden pegs that are sometimes put in such markers. In transplanting, the boys walk in the path made by the man who runs the wheel. All the planting, cultivating, and every thing, is done while standing in this path. The path is rather less than a foot wide—I presume because the ground is so high-priced and valuable.

The wooden frame that makes the handle of the machine is made of strips of board, sawed pieces say 1x2 in., perhaps 4 ft. long; then a round stick, say something like a hoe-handle, put in the top to hold it by, and strips put across to brace and strengthen the frame. To have the machine push easy you might drive a round piece of steel in the shaft at each end. Any man who can handle a saw, mallet, and chisel, and hammer and nails, could make such a marking-machine in a few hours. Of course, you can have it to space the plants any desired distance apart just as you like. I have given about the distance apart they plant them in Bermuda.

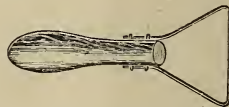
I happened to be present when there were three or four boys and two men getting the ground ready. I think they had about a barrel of onion-plants. The Bermuda people never trim off the roots or tops. They say they like them better just as they are dug. The man who made the marker took it in hand and ran it along the line with rapid strides—one of the boys who was planting, moving the opposite end of the line for him as fast as he had made a row. The whole piece of ground was nicely marked in a little time. One of the other men, who knew about how many onions would be needed, walked along the path, dropping the onions in little bunches to the right and left; then the transplanters got down to their work. A bundle of plants is taken in the left hand. With the right he picks up an onion-plant, places his forefinger on the bulb, then he sticks the onion, forefinger and all, down into the soft dirt. With his fingers he gives the dirt a little flirt over the roots; then another and another, as rapidly as a compositor in a printing-office picks up his types. The machine marks six rows, so the man in the path plants three rows as he walks along, and three as he comes back on the other side of the bed. I have seen quick gardeners at work in different parts of the United States; but I never saw men or boys anywhere who could come up to the Bermuda onion-transplanters. I suppose one reason for it is, it is their almost daily occupation, at least for a good many of them, for several weeks or perhaps months.

I thought at first the work was done carelessly. It did not seem to me that the onions were down deep enough, and some of the long roots were left sticking up out of the ground. If done on our own soil I should have said that, unless rain came immediately, and in abundance, half of the plants might die; but with the damp sea air constantly blowing in from off the water, nothing dies in Bermuda unless it gets the blight. The onion-plant will grow, even if it does not rain for a week after planting. If the sun is shining all the time they are planting, they will look considerably lopped down the first afternoon. The next day, if it is clear and bright, they will lop down under the influence of the sun a little; but about the third day they will stand up straight, and keep straight.

They do not use any Breed weeders—at least not as yet—and they do not meddle with the onions, so far as I could learn, in any way

until the weeds are big enough to pull and throw into the paths.

The most troublesome weed they have is what I should call a beautiful little flower. I believe most of the weeding is done by hand. I noticed our next-door neighbor, Mr. Webb, had what he called wire weeders. It is just a loop of wire stapled to a short handle of wood. Suppose you take an ordinary tool-handle, such as we have on files, for instance. Instead of boring a hole through the handle, as we do for a file, just bend a piece of wire as shown in the cut below, and staple the loose ends with poultry netting staples to the sides of the wooden handle.



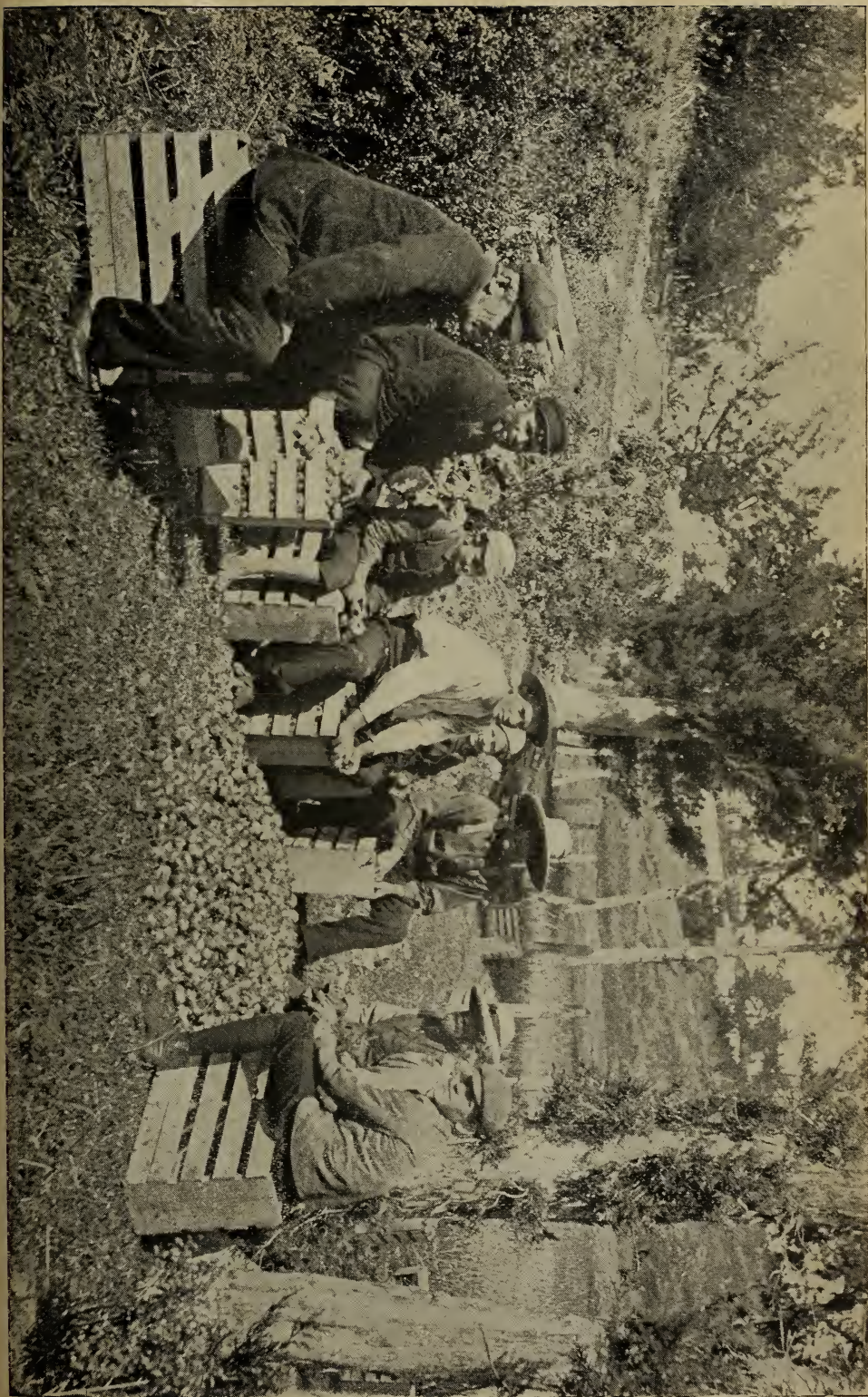
MR. WEBB'S WIRE WEEDER.

This weeder pulls the weeds out by the roots instead of cutting them off, and mellows the soil by breaking the crust, or what little there may be around the onions. The weeds are cleaned out of the onion-beds, and dropped in the paths. Sometimes they lie there and stay there till they take root again. I was going to remonstrate against this slovenly way, as it seemed to me; but when they got ready, a smart colored man, with a fork just a little narrower than the path, went along rapidly and spaded every weed out of sight. After every spadeful, with a flirting motion of his fork he made the soil fine and level. When this was done, potatoes were planted right along through the path. The potatoes were put in so that they will come on about the time the onions have covered the ground so as to crowd out the weeds. After the onions are pulled, melons are planted between the paths. I do not know how many onions they get per acre, but I think it is something like 1000 bushels when every thing goes well. The onions come into the United States markets just when our old onions are all cleaned up, and before any new ones are ready. Not only this, but it is claimed that the Bermuda onions have an established reputation for *quality*. They are all sound and firm, nice and clean, and mild compared with many of the home-grown onions. The fertilizer is stable manure, seaweed, and last, but not least, different brands of American fertilizers.

While over at my neighbor's, Mr. Webb's, I saw a large patch of onions of most beautifully rank luxuriance. The thrifty dark-green color indicated that they were heavily fertilized with something that suited them. I found this was a special manure purchased of Bowker.* Now, almost in the center of this rank luxuriance there was a little square spot of onions very much inferior; and this spot was defined by sharp straight lines. In fact, the rank strong-growing ones actually lopped over on three sides of this little square.

"Why, Mr. Webb, what is the matter with

*Made by the Bowker Fertilizer Co., 43 Chatham St., Boston, Mass.



SORTING AND CRATING ONIONS FOR THE MARKET, IN BERMUDA.

that square piece right in the side of your field?"

"Why, that poor place there is where I grew my onion-plants, and this ought to be the richest ground of the lot; but I did not have enough fertilizer to go over that little spot; as it had been heavily fertilized when the plants were started, I concluded it would be as rich as the rest, anyway; but it did not get any fertilizer at the time we gave it to the large bed while cultivating them. It was planted just a *little* later than the others, but that should not make the difference in color."

This little object-lesson illustrates clearly that, at least in Bermuda, it pays to apply a chemical fertilizer during the operation of cultivating, when onions are partly grown.

After the weeds are out they scatter the fertilizer among the rows until the ground is pretty well covered, or colored, you might say, with the fertilizer. It makes the whole surface of the ground look blue, in fact, or whatever color the fertilizer may be. After it is scattered it is stirred into the soil between the rows; then, when the rains come, the onions have plenty of just the food they like right where they want it, and at just the time they need it most.

They are having a good deal of trouble with the onion-blight, and they are trying the Bordeaux mixture, copperas solution, and various other chemicals. As with the potatoes, sometimes they seem to succeed, and at other times they do not. In gathering the crop, only the finest are put in crates for shipment. Seconds, I believe, are mostly sold out and consumed on the island. They have some trouble with the scullions; but I believe they make no use of these—they are just thrown into the compost-heap.

The business of selling onions bunched up is almost unknown in Bermuda, and they think it will not pay to ship to the United States, because they are perishable, and the market is so far off.

We submit a picture of an onion-field where they are sorting onions and crating them for the markets. Timber is so scarce in Bermuda that crating-material is all brought from New York or from Nova Scotia. I believe freights on lumber and such material are quite low, however, so the crates do not cost very much more than they do here.

Let me say, in conclusion, that I know of no prettier sight than a whole family busy at work near their home, among the potatoes and onions. The people seem to be contented, industrious, well dressed, and nice looking. They have pretty dooryards, gardens, flowers, and, with their neat stone houses, it makes a picture of thrift and industry that we rarely see anywhere else.

GARDENING FOR APRIL, 1.

Well, if you have not put in your first peas, do so at once—some Alaskas, anyway. Some of the sugar peas are a little more apt to rot in cold weather, but you might put in a few. Then you want to get in your onion-seed as soon as possible. Onions do better during

cool wet weather, and the frost does not hurt them, or very rarely hurts them, after they are up. Onion-sets of every description should go in at once. If you try to keep them out of the ground they are very apt to sprout; and if you want to plant old onions to get top sets, get them in also.

Lettuce and radishes can also be sown now in the open ground; parsnips and vegetable oysters as soon as you can get the ground in good order. Spinach had better be sown in the fall; but if it was not done, get it into the ground in the spring as early as possible. If you are dilatory, and the hot weather catches it, it will shoot up to seed, and not do much good. If you want to plant pie-plant roots, asparagus-roots, horseradish, or any thing of that sort, get them in as soon as possible, no matter what the weather is, if it is not too wet. Onion-plants grown in the greenhouse can not be put out quite as early as onion-sets and onion seed—that is, unless they have been well hardened off. You see, the shock is too great, and hardly any plant will succeed if much of a frost catches it just after it has been transplanted from under glass. Now is an excellent time to set strawberry-plants.

You had better get out a few extra early potatoes; and you might put them out on the Bermuda plan, given in our last issue.

Every season brings surprises; and the surprise just now is to find every thing almost a month ahead of what it usually is. The grass has made a fine start; wheat is looking splendidly; peach-trees are loaded with buds ready to blossom; soft maple has been giving honey for a week or two past when it did not rain so the bees could not fly. Pie-plant in the open air is almost ready to gather. Fruit-trees, apples, and almost every thing else, are showing the green leaf-buds, and no wonder; for there has been scarcely any frost or freeze since the middle of March. I gather by correspondence that this state of affairs is general almost all over the United States. Now, if Hicks had only said in his almanac that the latter half of the month of March would be just like what we usually have in the latter half of April, what a boom it would have given him! On the contrary, he puts out only vague hints of storms and terrible cold waves that will catch the farmer unawares without having his stables battened, etc.

Had it not been for the excessive rainfall we might have made quite a little garden. In fact, we did get out between showers to put in Alaska and American Wonder peas, which are now up bright and green. I wanted to get out our onion seed and sets, especially the latter; but the excessive wet made it out of the question, even on the most thoroughly drained soil. Crimson clover is just a green mat all over the ground, and I do not think the frost could pull it out by the roots, even if it tried ever so hard. Judging from the seed trade there will probably be a vast amount of gardening just as soon as the wetness is over. During the last two weeks it has been a problem to so arrange at least a little piece of ground that it can be worked in spite of the wet. A side hill with considerable slope,

porous soil, well underdrained, comes the nearest to it. Plant-beds that are raised up so the soil is, say, six inches above the paths, answer the purpose pretty well. We took off all our sashes two weeks ago, stored them under the painted boxes where we keep them in the summer, and the most of them have not been out from under the boxes since. A few times we have covered the tomatoes and other kinds of plants just transplanted.

It should be borne in mind that cabbage, cauliflower, celery, lettuce-plants, and other hardy stuff, need protection from frost almost as much as tomatoes, when they are first transplanted out in the open air. After they have got rooted and to growing, you can gradually harden them off so they will stand a frost that will freeze the ground hard enough to bear up a person. It is rather better, however, to have glass over them whenever the ground freezes.

To-day is March 25. Last night we had the hardest freeze in the past two weeks. In fact, the muddy roads were almost hard enough to hold up a man's weight; but I do not think it has hurt the strawberry-plants materially by lifting them out.

Our buffalo-berry bushes were just loaded with bloom; and in order not to lose the fruit again we covered them with cotton sheets, the kind we use for spreading over our wagons when we gather seeds. Our early strawberries under glass are now loaded with fruit. Of course, we cover them whenever there is a frosty night. I am watching every day to see runners start, so that we can have potted plants as early in the spring as possible.

SWEET CLOVER ONCE MORE.

We copy the following from the *Agricultural Epitomist* for January:

At the North, *Melilotus alba* is considered a weed and a pest—not looked upon with any degree of favor except as a valuable plant for bee pasture. In the South, it is one of the most valuable fertilizing and hay plants we have; also highly appreciated for its early spring and late fall pasturage. Stock are not fond of the plant at first, but soon acquire a taste for it. For dairy cows the hay is specially valuable, very largely increasing the flow of milk and the yield of butter, improving the quality of both, in fact. None of the clovers are superior to it as a fertilizer. It grows satisfactorily only on land well supplied with lime. It is distinctively a lime plant, and if there is but a very small per cent of lime in the soil it will not thrive well, and we advise against sowing on such lands. On our lime prairie soils of East Mississippi and Central Alabama this plant is largely grown. It thrives admirably with Johnson grass—in fact, the two supplement each other nicely. The strong, deep-penetrating roots of the melilotus loosen up the hard subsoil and enable the Johnson grass to grow off to better advantage.

It matters not how severe the drouth or excessive the rainfall, melilotus is a certain crop—a sure crop, independent of any variation of the seasons—a plant that can be depended on.

As a fertilizing crop, it can not be excelled, if equalled, by any of the leguminous soil-recuperating plants. On soils where the highest limit of corn production did not exceed eight bushels per acre, a few years of melilotus-growing on the land so enriched the soil that thirty bushels of corn per acre was easily raised.

Melilotus is a biennial, and reseeds itself every two years. It stands cold as well as alfalfa and red clover.

We have no seed for sale. We have no personal motive in speaking so highly of the merits of this plant. Recognizing these merits that characterize this plant, having personally witnessed the practical values of

the plant on our own farm as a fertilizer, hay, and pasture plant, we feel in a humor to do it justice by giving greater publicity to its virtues.

Is it not strange that a plant that has proven itself so meritorious at the South, and growing steadily and continuously in favor here, has no friend in the North to sing its praises or accord it any worth whatever, save the apiarist—the owner and lover of the honey-bee?

EDWIN MONTGOMERY.

Starkville, Miss.

Please notice the writer is not a bee-keeper, does not sell seed, and has no interest in any shape in the matter. I would call special attention to what he says about its value in the South, and I want to add that we very much doubt whether there is a place in the North where cows can not be taught to eat sweet clover when it is pastured or cut at the right stage of growth. I am sure there is not a locality anywhere where it will not prove to be one of the best plants known to enrich impoverished soil by plowing it under. Our experiment stations are pronounced in its favor wherever a test has been made. Since the matter has been suggested in regard to *lime* for its best growth, I am inclined to think our friend is right about it. This thing, at least, is true: It will grow on ground so poor that no other plant can be made to make a stand. In fact, it grows with rank luxuriance on soil thrown out from deep railroad cuts; and such land can be made productive by plowing under a heavy growth of sweet clover, without adding anything else; and, astonishing as it may seem, where the ground is rich, and will grow all sorts of weeds, we oftentimes fail to get a good stand of sweet clover.

PRIZETAKER ONION-SETS GOOD KEEPERS.

I learn from a neighbor that his Prizetaker sets have also kept well (unfortunately he has none for sale), and that the green Prizetaker grown from sets makes a very salable bunch onion.

T. GREINER.

La Salle, N. Y., March 21.

I am very glad to know that somebody else has made the same discovery I have. Now, friends, here is the point: Sow a lot of Prizetaker onion seed in a broad drill. Put them in very thickly. Get them in just as soon as the ground can be worked nicely; then put up a notice in your dooryard, "Prizetaker onion-plants for sale—15 cts. per 100; \$1.00 per 1000." Sell all you can, just before it is time to transplant; let the rest grow. If they are planted thickly enough they will make nice onion-sets which ought to sell readily at \$1.00 a peck. If your ground is very rich, and they grow too large for sets, sell the largest ones for table use, medium size for pickles. The great nuisance with all kinds of onion-sets is the tendency to sprout before people get ready to make garden—especially tardy people. I confess I am a little surprised that the sets keep so well when the Prizetaker onion itself is not, as a rule, a good onion to keep over.

ACORN ONION-SETS, ETC.

What you say in GLEANINGS, March 15, about the acorn onion-sets (taking up the parent onions in the fall and planting them again in the spring year after year for sets) will do for some three or four years; but after that new bottoms ought to be planted, or else they become too much exhausted to produce fine onions.

M. D. WENGER.

Elkhart, Ind., March 21.

TOP ONION-SETS.

As long ago as when I was a lad, our people raised these same "top onion-sets," and for keeping qualities and firmness I have never found their equal; and if grown in a favorable season they are very crisp and sweet-flavored. In a very dry season they will grow very slowly, and be strong, and small in size. This is true of any onion, so far as my experience goes. It has been my custom to raise from one p-ck to 12 bushels of these sets every year for the last 25 years. There is always a local demand for these sets in our section, and they are staple goods. The principal use is for green onions before others mature.

Kirkwood, N. Y.

C. G. MARSH.

COFFEE BEANS.

I have raised several kinds of coffee beans, and wish to say that, besides using them for coffee, we cook them as we do other beans, and find them very palatable; and as for nutriment, they have but few equals. They also make some of the richest kind of meal for a cow giving milk, and are very useful to feed hens as egg-producers. I have none for sale.

Hendersonville, N. C.

J. L. HUBBARD.

I am glad to get the above, for I have for a long time felt that the coffee beans were valuable for many purposes besides coffee. They will grow on any soil, and with any sort of a chance will make a tremendous yield. The plant is as valuable as any of the clovers for improving the ground. Let us have them raised in such quantities that they can be sold as cheaply as the navy beans.

SWEET-POTATO CULTURE—GROWING THE PLANTS.

Making the plant-bed usually begins about the first of April in Southern Ohio; farther South it should be earlier; north, later. The bed that is easiest for the novice is the "manure bed." This can be made by setting the frame on top of the heating manure, or by digging a pit a foot deep, dumping in the manure, and setting the frame over this. In either case it is necessary that the manure should "heat up" before putting on the dirt. If you wish the bed to hold heat a long time it is better to use two feet of straw in the bottom and the manure on top of this. Be sure to tramp it down well before putting on the dirt, which should be about 3 in. deep, and not packed. Also provide drainage. If this should be neglected you may awake some morning and find your bed filled with water. This would cause a rapid cooling of the manure. After making the bed, place a thermometer in the dirt; cover it with boards or cotton cloth (you will not need sash for this bed), and allow the temperature to run down to 90° before bedding the potatoes; 100° will not hurt the potatoes if you have properly tempered them before bedding. If you depend upon buying your potatoes, keep them in a warm corner by the kitchen stove at least a week; they will have become acclimated by that time, and the high temperature of the hot-bed will not cause so many to rot. I have seen many beds burn up the potatoes because they were too cold, and the change in temperature was too sudden. Before bedding my potatoes I usually run the temperature up to 90° a week before taking them from the cellar.

With bottom heat, be careful that the potatoes do not touch each other, and do not cut the large ones. Cover the potatoes with 4 inches of fine sifted loam or sand. I believe I prefer a mixture of well-rotted manure, fine garden soil, and wood ashes run through a sieve with a ¾-inch mesh. I know many will object to covering the potatoes so deep, but I am sure they will root better in 4 inches of soil than in 2 inches.

Never water till the sprouts are well through, and then water in the morning on bright days. Watering in cloudy weather or late in the evening often causes the plants to take a set.

If you are going to raise enough plants for an acre of ground, and have enough to supply your neighbors also, you will find the manure-bed too laborious. Some three years ago I planned to heat a bed by blowing steam into tiles. Just as I was ready to bed my potatoes my boiler sprang a leak, and I put in the potatoes without any bottom heat whatever. In following this plan I find it is necessary to start the potatoes in the cellar by running the temperature up to 90° some two weeks before bedding; have the frames well protected on the sides, and leave the sash on till the sprouts are well through the ground. In this form of

bed the potatoes can lie close together; in fact, I carry them from the cellar and dump them, spreading them with my hands. Do not ventilate during the warm days, even if the temperature should run up to 110°. Let the first few sprouts that appear burn; it will not damage them much; they will soon regain their vigor when the bed is ventilated. Just as soon as the sprouts begin to show over two thirds of the bed, then it is time to give ventilation, and soon the sash can be left off during night and day, but must always be put on whenever there is any indication of frost. The sweet-potato plant will not stand freezing, no matter how much they have been hardened. The same rule for watering will apply for this form of bed also.

The plants will not come up so evenly in this form of bed, and the first year I clipped them off whenever they grew over four inches high; but this seemed to stunt the plants so much that I thought of another plan which I find to be very successful. Whenever the plants reach 4 or 6 in. in height I pull them and heel them in good rich mellow soil, where they can get plenty of sunshine, and about 25 to the foot.

I dig a shallow trench with a spade or mason's trowel, then take a handful of plants in my left hand, and, by the aid of my right, just spread them along in the row, pushing the dirt against them so they will stand straight, making the rows 10 inches apart. I water them the same as the beds; they must not be watered on cloudy days, and they must be protected from rain. If you are not cautious about this you will find them growing with the stem rot some-day when you are least expecting it.

By following this plan you will be able to get five or six pullings from a bed. Every time you pull the plants that are ready it gives the remaining ones a much better chance. You will also find these transplanted plants ever so much better than those just taken from the bed, and you will get almost double the amount of plants also.

This method of transplanting plants will serve just as well for other plants, especially those that have come from a distance. I never set plants in a field that are shipped to me, unless the weather is very favorable. Heel them in and wait till they start to growing, which will be shown by the little white root-lets making a fresh start.

I neglected to say that one must not stamp the manure with the feet, but must take a board the width of the bed and walk across, stepping off, turning over, and walking back, repeating this till the bed is finished, then put on the dirt.

Lebanon, Ohio.

J. Q. MULFORD.

Concluded in next issue.

PILGRIM SONG.

BY REV. NORMAN PLASS.

We, as pilgrims of a day,
Only once can pass this way;
Therefore let us not delay.
Any good we can bestow
As we on our journey go,
That will prove a boon indeed,
Let's bestow it.

Any kindness we can show
That will ease another's woe
And his hungry spirit feed,
Let us show it.

Any lustre we can throw,
Others' paths to set aglow
And their feet to glory speed,
Let us throw it.

Let us not defer, neglect;
God-sent moments we reject
When our time we select.

Let us fill each moment, then,
Full of fragrant gifts to men;
We'll not pass this way again.

DANZENBAKER'S BOOK.

I have had Danzenbaker's "Facts about Bees" a long time, but never took particular time to read it thoroughly, nor see how very practical it is, till yesterday. I read it through, and, without any exaggeration at all, I positively think it the best and most common-sense and practical little book I ever read, and I have been reading beeology for the last 25 years.

Kingston, N. Y., Feb. 24.

AARON SNYDER.